SCALE OF ENTERPRISE IN FARMING

*A Report by the Natural Resources
(Technical) Committee*

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SUB-COMMITTEE ON AGRICULTURE

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FOREWORD

THIS report has been prepared by the Sub-Committee on Agriculture of the Natural Resources (Technical) Committee. The Committee was constituted in 1950 to, advise on the technical problems of the development, use and conservation of the natural resources of the United Kingdom. The use to which one of our most important natural resources, agricultural land, is put has always been an important aspect of the Committee's advisory responsibilities.

The purpose of the present study is to bring together the available information showing how farm size, scale of enterprise and efficiency of agricultural production are economically inter-related. These relationships are important in agricultural management and also in what has become known as the "small farm problem". While the present report is not intended as a definitive study of the latter question it does deal with the more general problem of how agricultural production is organized within the current pattern of farming, and with the effects of farm size on the economics of production.

A list of members of the Sub-Committee and the Steering Group on Scale of Enterprise in Farming is attached. To the latter belongs the credit for the assembly and study of the information itself, and for the specialised knowledge on which the report is based. Thanks are due as much to the "Official" members of the Sub-Committee and the Steering Group, who must remain anonymous, as to the independent members who are listed on the opposite page.

In addition, the Sub-Committee wishes to record its thanks for the generous assistance received from many private persons and institutions during the course of its study.

S. ZUCKERMAN,
Chairman.

November, 1960.

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Scale of Enterprise in Farming

INTRODUCTION

Agriculture as a national resource

These major facts about British agriculture will help to give perspective to this study:

The farm land of Great Britain is some 45 million acres, out of a total land area of 56 million acres.

About one million people, or some 4 per cent of the working population, are directly employed on the land.

About one half of the nation's food is produced at home. The total output of the industry, measured in terms of cash receipts to the farmer (including production grants, etc. and the value of stocks in hand) was £1574 million in 1958/9; actual farm sales amounted to £1451 million in the same year. Agriculture accounts for about 4 per cent of the Gross National Product, compared with about 3·2 per cent for coal and 2·5 per cent for the iron and steel industry.

Government payments to the industry have been increasing steadily in recent years. In 1955/6 they were £206 million; by 1957/8 they had risen to £279 million, although they were lower in 1958/9 at £243 million.

The total receipts of the industry are, to some indefinite extent, increased by tariffs and quotas and by the monopoly position of the Marketing Boards.

The net income received by all farms fluctuates from year to year; it is estimated at £327 million for the year 1958/9 or about 1·7 per cent of the net national income.

The progressive increase in 'efficiency'* of the industry was estimated, in the statutory review of the industry for 1956 (Cmd. 9721) at "something like £30 million a year for the industry as a whole, which is equivalent to about 2 per cent of the gross output". This was said to arise mainly from improvement in husbandry and farm management within individual farms as now laid out.

This is not the place to discuss whether and to what extent the costs to the nation are offset by gains in improved terms of trade. It is sufficiently obvious that lowering costs in this major industry, with a consequent reduction in the need for subsidies, would be of great benefit.

A rising level of material prosperity in any industry suggests that resources are being used with increasing efficiency; and the application of new techniques and knowledge implies a continuous process of change, including changes in the techniques and organisation of production. This proposition should in theory apply to the farming industry in the same way as it does in every other field of economic endeavour. In agriculture, however, the effect of economic pressure is complicated by the extreme diversity of the industry, the numbers of individual productive units and their variation in size and function, as well as by such

*Definitions of some of the terms used in this study are given in Appendix A.

factors as price supports, tariffs, quotas and monopoly marketing arrangements. It is, therefore, desirable to isolate and examine the many factors that affect the efficiency and economy of farming operations, so that those favourable to increased efficiency of the industry as a whole may be encouraged, or, if necessary, initiated.

Object and scope of the study

One of the most important aspects of farming organization is the pattern of farm size; that is, the distribution of the farm land between farms. Historically, this pattern changes only slowly, much more slowly than economic and technical trends affect the economy of farm production, and this study is mainly directed at this relatively stable aspect of farming organization. It is thus concerned more with the way in which the present organization of farming affects its economic efficiency than with the effect of improved techniques on the operations of the individual farm, though the two are, of course, closely related. It examines such information as is available on the relationships between farm size, scale of enterprise (as measured by output and resources used) and economy and efficiency of production and discusses the factors concerned in such relationships.

We cannot, of course, hope to produce complete answers to the host of problems concerning efficiency and scale of enterprise. Though certain aspects have been studied in detail by the appropriate authorities and institutions, the problem as a whole is so large and complex that no single organization has been able to provide the very considerable resources demanded by a definitive study. The best use must be made of the available data (often collected for other purposes) even when this is insufficient or unsuitable for formal scientific analysis.

The study must also be restricted mainly to the economic aspects of farm size, in spite of the fact that many other factors, social, psychological and historical, have influenced and will continue to influence, the distribution of farm land between farms. All that can be done is to comment qualitatively on these factors as they arise; the social and psychological implications of possible changes are beyond our scope. This is not to say that these factors are of little account in the determination of policy; but to attempt to include them in an investigation of the present kind is impracticable. Indeed, this study does not purport to do more than bring together the available information on the relationships between size of farms, scale of enterprise and economic efficiency and offer some conclusions and reflections on the factors at work.

Measurements of scale

The expressions "a large farm", "a medium-sized farm" and "a small farm" are not exact terms. They involve two separate ideas of size; first, bigness or smallness in farming is concerned with acreage of the land farmed; second, the expression "a large farm" carries the connotation of greater size as a business enterprise. These two concepts can conflict. A "large" hill farm of several hundred acres of rough grazing is a comparatively small business, while a highly intensive holding specializing in, for example, egg or pig production, may be a very much larger business enterprise even though it may not occupy more than a few tens of acres. We must therefore distinguish scale of enterprise from size of farm. For convenience we shall use the latter term in its restricted sense of acreage, reserving the former for comparisons of scale of operations.

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Scale of enterprise in farming, as in industry, may, in general, be measured in terms of output. As the products of farming are heterogeneous, measurements of output must be made in terms of money value. However, prices paid to the producers in some instances include a subsidy or the subsidy payment may be separate. Also, the true value of the products may be distorted in one direction by a restriction of supply by tariffs and in the other by imports at less than the cost of production: prices of farm products may also be distorted relative to each other. Since the effects of all these factors on the true value of farm products are impossible to assess simply, output measurements cannot be made except in monetary terms, however unsatisfactory this may be.

In addition to the difficulties involved in measuring value of farm products in terms of actual prices paid to the farmer, there is a further difficulty due to the complex nature of the industry. Some farms may devote their resources to producing a particular product from start to finish, e.g. from calf to beef; the value of the finished product in such a case is therefore a complete measure of the farm output. Some are almost exclusively "finishers" of the products of other farms. A third group may be partly primary producers of semi-finished products, partly primary producers of finished products, and partly finishers of other farmers' products. All farms are to some extent dependent on outside sources for fertilizers, feedingstuffs, seeds and breeding stock. This difficulty can be partly overcome by using value of output as an index and deducting the value of items brought in from other farms at home and abroad, thus arriving at the value of the net production of the farm. However, since small farms are likely to be processors of purchased feedingstuffs, any measure of net output between small and large farms may involve a false comparison.

In describing size of farms as opposed to scale of enterprise, we use the terms small, medium and large (where precision is not required) to describe farms in the 20–100 acre, the 100–300 acre and the over 300 acre size ranges respectively. Where it has been necessary to distinguish between farms of 300–1000 acres, and those over 1000 acres, we have used "very large farms" to describe the latter category. Similarly, we have referred to farms of 20–50 acres as "very small farms". We have not considered either specialist or part-time farms, and farms in the 0–20 acre size group, which consist very largely of such farms, have not been included in the comparisons made later in this report. Some farms in the 20–100 acre size group may also not be full-time but they are not distinguished in the available data.

Agricultural output and the small farm problem

Holdings of less than 100 acres account for only about a third of the available farm land in England and Wales. General changes in the efficiency of production throughout the range of small farms will, however, have a more than proportionate effect on agricultural production as a whole, because of the higher intensity of production on them. The "small farm problem" is therefore specially important to the national agricultural output and this is recognized in the Government scheme of assistance to small farmers (Cmd. 553 Assistance for Small Farmers) extracts from which are given in Appendix B. It is of even greater importance sociologically, because the majority of the nation's farmers are small farmers. These small farmers are prevented by farm size and by other factors from adapting themselves quickly to changes in their economic environment.

Nevertheless, whether or not inflexibility is a serious factor in the present

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agricultural situation, the fact must be faced that, under present circumstances, the short-term interest of the farmer, particularly the small farmer, does not always coincide with the longer-term national economic interest. For example, the farmer with few acres, whose return is insufficient to give him the standard of living he desires, generally attempts to increase his total production. He rarely has the opportunity of adding to the acreage of his farm and he must, therefore, increase the intensity of his operations. He usually steps up the production of those commodities which he is already producing and with which he is familiar, rather than undertaking to produce other items which require different skills or heavy capital investment. In the recent past this has meant intensifying the production of milk, eggs, and pig products requiring the purchase of greater quantities of feedingstuffs which he cannot produce himself. Consequently, the national expenditure on subsidy payments for these particular products has increased. This has led to pressure to reduce the level of price support, which results in a reduction of the small farmer's gross receipts while his total expenditure remains high. In the February Price Review, 1958, for example, the over-supply of milk, eggs and pig products resulted in a reduction of the level of subsidy on these items. The intensification of production of milk, pigs and eggs has also led to substantial imports of feedingstuffs in recent years. The cost of these imports of feedingstuffs must therefore be set against the saving of foreign exchange in the purchase of livestock products from abroad.

The farmer with few acres is thus squeezed by two sets of economic pressures. On the one hand, to keep up with the general rise in incomes he must increase his margin of receipts (including subsidies) over direct expenditure and in nearly all cases this means that he must increase his output. On the other hand, if he does this, then both the satisfaction of demand and the national reaction to the increasing total of the subsidy payments, tend to depress his margin of profit still further. Although reducing the costs of production is the obvious solution, their general pattern appears to depend not only on the farmer's technical efficiency, but on the extent and nature of his farm and on the farming system he adopts. It is at this point, therefore, that the small farm problem is directly linked with the purpose of this study.

The problem of the small farmer is not unique to Britain although it has certain features which are special to this country. It appears to develop as the application of technological advances tends to raise the gross level of agricultural production at a rate faster than the growth in the demand for agricultural products. In order to sell this increased production, prices fall to such an extent as to bring a smaller total return to producers. This trend cannot be arrested by binding new markets since most industrially developed countries protect their agriculture against foreign competition and the under-developed countries with their slender foreign exchange resources import industrial goods rather than food. Assuming no government intervention, there is a smaller total of gross receipts which then has to be shared by the farmers in the country concerned. If the general level of costs is maintained, either the income of farmers as individuals must fall or, if the level of income is to be maintained, some of them must go out of business. Additionally, since living standards in an industrially developed country tend to rise, the farmer wants his income to rise in roughly the same proportion as in the country generally. In short, therefore, the tendency is either for the proportion of the farmer's income represented by subsidy to increase, or for farmers' real incomes to

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decline, or for the total market returns to be shared among fewer farmers. The problem applies to farming generally, but small farmers are less able to withstand the effect of these forces than the larger farmers whose resources, both financial and in terms of land, permit them a greater degree of flexibility in their adaptation to economic pressures.

Up to the present these tendencies have been less marked, or have begun to operate later in the United Kingdom than in some other countries. They have been masked by the marked rise in the proportion of supplies that are home-produced; on a value basis the rise is from approximately 33 per cent pre-war to roughly 50 per cent today. The gross receipts of our farmers have in fact increased year by year up to 1958/9, the latest year for which information is available. How far there is still scope for this trend to continue is a matter for conjecture. It is clear that with some commodities, e.g. meat, the proportion that is home-produced is still increasing and that there is room for a further rise. Improvements in quality of home produce will contribute to the increase. Substitution has also been taking place, and still continues, of high-priced, home-produced foods (eggs, milk, fruit and vegetables) for farinaceous foods, giving the home producer further opportunities for increasing his share of the market. There are therefore certain factors at work in the United Kingdom which may to some extent reduce the impact on the small producer of the forces described above.

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PART II

BACKGROUND TO THE STUDY

COMPARATIVE DEVELOPMENT OF AGRICULTURE

Comparison with industry

Both the volume of business and the physical size of the average productive unit in manufacturing industry have steadily increased since the Industrial Revolution. These increases and the parallel social changes have been brought about largely as a result of the discovery and exploitation of new sources of power, resulting in a manifold increase of the productivity of the labour used, and promoting grouping into larger productive units. At the same time, the economies involved in mass production and the growth of new markets has led naturally to increased size of business. There is no need, therefore, in manufacturing industry, to distinguish between trends towards increasing size of productive units and trends towards increasing volume of business. The social, economic and technical forces operating to change the organization of industry have in general worked in one direction, towards increasing scale of enterprise.

In agriculture, on the other hand, there have been no great changes in the average size of British farms in the last 150 years, although output is greater and the labour used is less. While the industrial revolution in manufacturing industry has led to the growth of giant enterprises employing thousands of men, it might almost be said that its analogue in farming has tended to encourage the one-man, high output small farm.

Changes in the physical size and grouping of the available farm land have been limited both by geography and by social factors (such as the individual ownership of land and its inheritance from one generation to the next). For these and other reasons, therefore, the diffusion of the ownership of land by means of limited liability companies, which might facilitate increases in physical size and provide additional flexibility to meet technical and economic change, has not occurred in farming to any marked extent. As in industry, however, technical progress in agriculture has led to major increases in the productivity of the labour used. The increase is probably less marked in agriculture, because although much may be effected by bringing mechanical power to the farm and by increasing the fertility of the soil, limits to increases in yield per unit of labour are imposed by various physical factors. Furthermore, the effects of technical development on the economic organization of agriculture have been restricted by sociological factors which have not operated in manufacturing industries. The effects of technical development have therefore been largely in the direction of increasing scale of enterprise without parallel increases in physical size.

Comparison with the pattern of farming abroad

It is hardly worth while comparing British agriculture with those countries overseas in which agriculture is very different (e.g. the rice-growing areas of the Far East), or where the historical background has clearly resulted in major effects on the pattern of production which are absent in Britain (e.g. most European countries). It may, however, be of some interest to refer briefly to what has happened, in the newer-developed agricultural countries of U.S.A.,

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Canada, Australia and New Zealand. In these countries the development of agriculture proceeded along mainly economic lines, unhampered by social customs or the existence of previous property rights. The governing factors were abundance of land, scarcity of man-power and a growing market. The pattern of agriculture in these countries has therefore tended to follow the logic of economic and technical development to a much greater extent than in Europe. For example, in North America monoculture was originally very common; this reduced the cost of machinery and large areas were able to be worked by a few men. The development of very large farms or ranches practising an ultra-extensive system of farming has only been possible by complete specialization in one product (e.g. beef in the South Western States of the U.S.A., sheep in Australia). There are indications, however, that the difficulties of direct management of very large farms (as opposed to ranches) have been considerable, and it is of interest that company farming is not common. In general, even mixed farms in the newer developed countries are a great deal larger than in the United Kingdom. Nevertheless, the same tendency towards reduction of the labour force has occurred in recent times and the majority of the farms in the U.S.A. employ only a few workers and are of a size which can conveniently be supervised by one man. There has been much amalgamation of farms in the U.S.A. in recent years, indicating a higher degree of flexibility than in the United Kingdom.

SIZE PATTERN OF BRITISH AGRICULTURE

The number of holdings for England and Wales in four size groups and the total acreage farmed in each group is shown in Table I (Agricultural Census, 1955—the census returns refer to "holdings" and exclude rough grazing). There are about 30 000 cases in which two or more holdings are occupied by the same farmer, and to avoid a certain number of them treat their several holdings as a single farm business. Nevertheless, in all except the smallest holdings, the multiples are not sufficiently common to make it unreasonable to treat the term "number of holdings" as synonymous in this study with the number of separate agricultural units. Many of the separate units in the smaller size groups, especially agricultural units under five acres, are, however, holdings providing only part-time employment for the occupier.

TABLE I

Analysis of holdings by number and acreage (England and Wales 1955)

Size Groups acres	Holdings		Acreage	
	Number	Percentage of total holdings	Total acreage	Percentage
0–20	166 694	45	1 106 444	4·5
20–100	125 778	34	6 470 679	26·4
100–300	73 380	20	14 057 947	57·4
Over 500	3 713	1	2 862 046	11·7
Total	369 565	100	24 497 116	100

Table I also shows the very large number of small holdings of less than 20 acres (45 per cent of the total holdings in England and Wales). The pattern for Scotland is similar. For the same year, 58 per cent of the total holdings in Scotland were under 30 acres or less, while 20 per cent were over 100 acres in

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extent. The information is also illustrated in Fig. 1. Holdings below 100 acres account for nearly 80 per cent of the total number, but for only about 30 per cent of the total farm land, whereas holdings over 100 acres are comparatively few in number, about 20 per cent of the total, but add up to about 70 per cent of the total farm land.

Thus, British agriculture, in terms of numbers of holdings, is predominantly
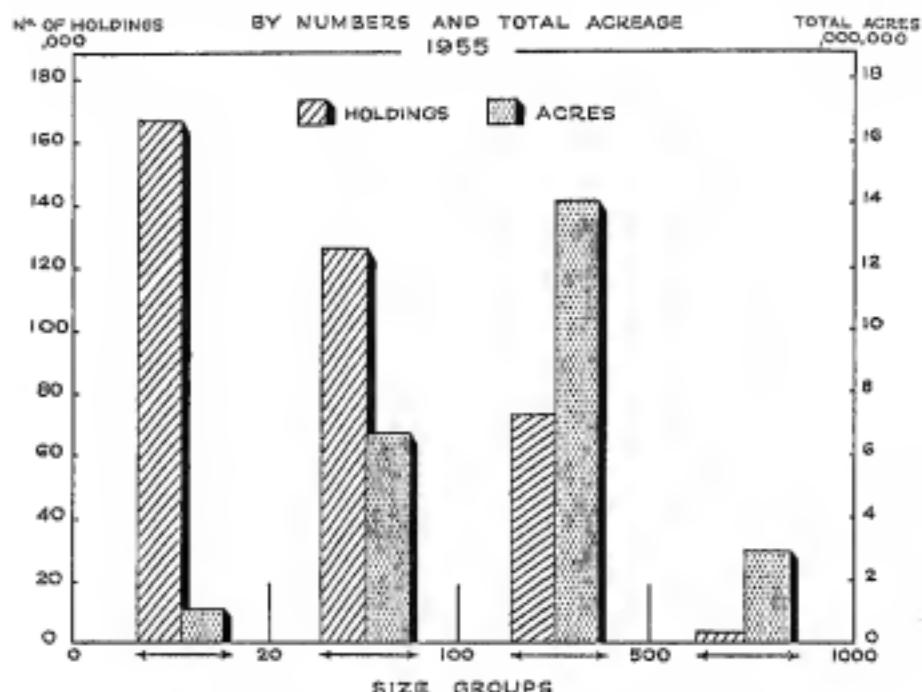
FIG. 1. *Relative importance of acreage-size groups*

organized on a small farm basis, although the greater part of the total productive acreage is farmed by the larger units.

The total number of holdings* has been declining for a considerable time, more rapidly than the declining acreage of farm land implies. The available data is summarized in Table II below which shows the number of holdings in each of the five size groups for selected years between 1885 and 1955, and the percentage change in the numbers of holdings in each group based on the 1885 figures.

The relative decline in the number of holdings is shown in Fig. 2. The relative decline in the number of the very small holdings (under 20 acres) and the larger holdings (over 300 acres) has been about the same, but owing to the larger numbers in the 1–20 acre group, this is masked if only the number of holdings are considered. The numbers in all size groups have fallen in the last thirty years, but prior to that the middle-sized groups (50–300 acres) showed some increase. Only the 50–100 acre group shows an increase at the present day

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*In view of the ambiguity of the term "holdings", it is possible that the decline in numbers returned represented no more than paper amalgamations. It is not, however, considered that this is sufficiently common to upset the general inference.

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TABLE II

Numbers and percentage change of holdings from 1885–1955 by size groups

a=numbers of holdings in thousands.
b=percentage change in numbers, based on the 1885 figures as 100 per cent.

							Size Groups						
	under 20 acres		20–50 acres		50–100 acres		100–300 acres		300+ acres		Total	
Year	a	b	a	b	a	b	a	b	a	b	a	b
1885	241	0	73	0	55	0	67	0	17	0	453	0
1895	225	—7	75	+3	57	+4	68	+2	16	—6	441	—3
1913	214	—11	78	+7	59	+7	69	+3	15	—12	435	—4
1921	197	—18	81	+11	61	+11	68	+2	13	—23	420	—7
1931	173	—28	77	+5	62	+13	67	0	12	—29	391	—14
1939	168	—30	72	—1	61	+11	66	—1	12	—29	361	—20
1950	167	—31	68	—7	60	+9	65	—3	12	—23	373	—18
1955	167	—31	66	—10	60	+9	64	—4	11	—33	370	—18

as compared with 1885. the decline in the number of larger holdings can be partly explained by the reversion of land to rough grazing on many large farms, resulting in their inclusion in lower-size groups although their geographical boundaries remained unchanged. Owing to afforestation, the number of large farms in certain areas has also diminished. There has been a general increase in numbers in most size groups since 1939. This increase in the 1–20 acre
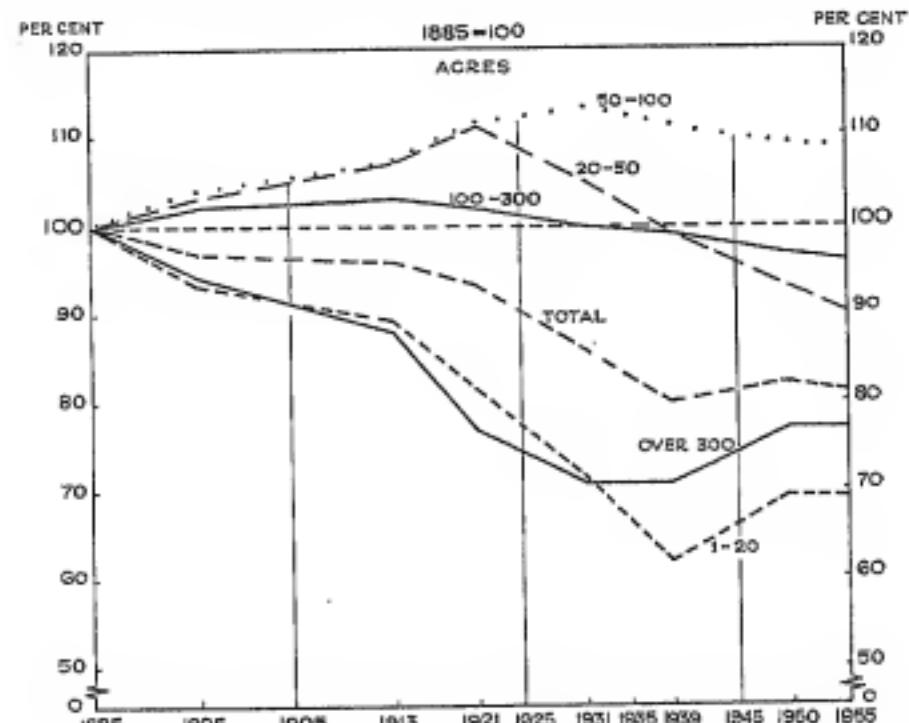

Fig. 2. *Percentage changes in numbers of holdings by size groups 1885–1955*

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group may not be entirely genuine since rationing of feedingstuffs was a spur to the rendering of returns between 1940 and 1953. Also during the present century there have been successive statutes providing for the creation of small-holdings; these have in some cases been created by the break-up of large farms, thus reducing the number of large farms as well. On balance, therefore, over the past half-century there has been a substantial fall in the number of privately-owned small-acreage holdings as opposed to statutory smallholdings. On the other hand, the figures tend to support the view that developments since 1939 have arrested the rate of decline of the number of holdings.

It might be argued that there is too much variety in British agricultural practice to enable general trends in scale of enterprise to be discerned. That there is wide variety must be accepted; only in a few areas, notably the Highlands and the Fens, are there large areas of land closely similar in soil, topography and climate. Elsewhere, the soil and the climate varies considerably and these natural features are overlaid by economic factors such as accessibility to roads and railways and nearness to population centres.

The "natural" response to this varied physical and economic pattern is, in very broad terms, that the eastern half of the country is predominantly devoted to crops and the western half to livestock; the mountainous north and west to sheep; the dry and sunny south-east to fruit; and so on. But with certain exceptions it is rare to find a district which is devoted exclusively to a single crop or to a single type of stock. Even within the boundaries of a parish, variations of husbandry are either forced upon the farmer by external circumstances, by the size of the equipment of his farm, or are chosen for personal reasons. In practice, too, there are considerable additional variations in the economics of production due to the differing abilities of the individual farmers.

Regional differences in farm size

All these factors are reflected in the regional distribution of farm size, although over the country as a whole there is a fairly even assortment of large, medium and small farms. The map (Figure 3) shows how holdings in the 20–50 acres, 20–100 acres, and the 300 acres and over size groups are distributed over the counties of England and Wales. (The 1–20 acre size group containing most smallholdings and a number of "specialist" enterprises, is not represented.) The map is based on the percentage of the crops and grass in each county on holdings of the above size groups. Counties are shaded if this percentage exceeds the national average for the size group concerned. For the sake of clarity the middle size group (100–300 acres) is not represented.

The map shows the following:

(a) There is a tendency for the density of larger farms to increase from West to East. In terms of actual size of holdings, the map probably exaggerates this since the percentages are those for acres of crops and grass only, and there is more rough grazing in the hill areas of Wales and the West than in the better land areas of the Midlands and the Eastern counties.

(b) In the Eastern half of the country the general pattern is modified by local factors. For example, East Sussex, Middlesex and the Fens have a greater density of small farms than the surrounding counties. This may be attributed to a combination of high fertility, good communications, and nearness to population centres encouraging intensive dairy and mixed farms.

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	ABOVE AVERAGE FOR 20–50 ACRE FARMS
	ABOVE AVERAGE FOR 20–100 ACRE FARMS
	ABOVE AVERAGE FOR 300+ ACRE FARMS
	BELOW AVERAGE FOR ABOVE THREE SIZE GROUPS
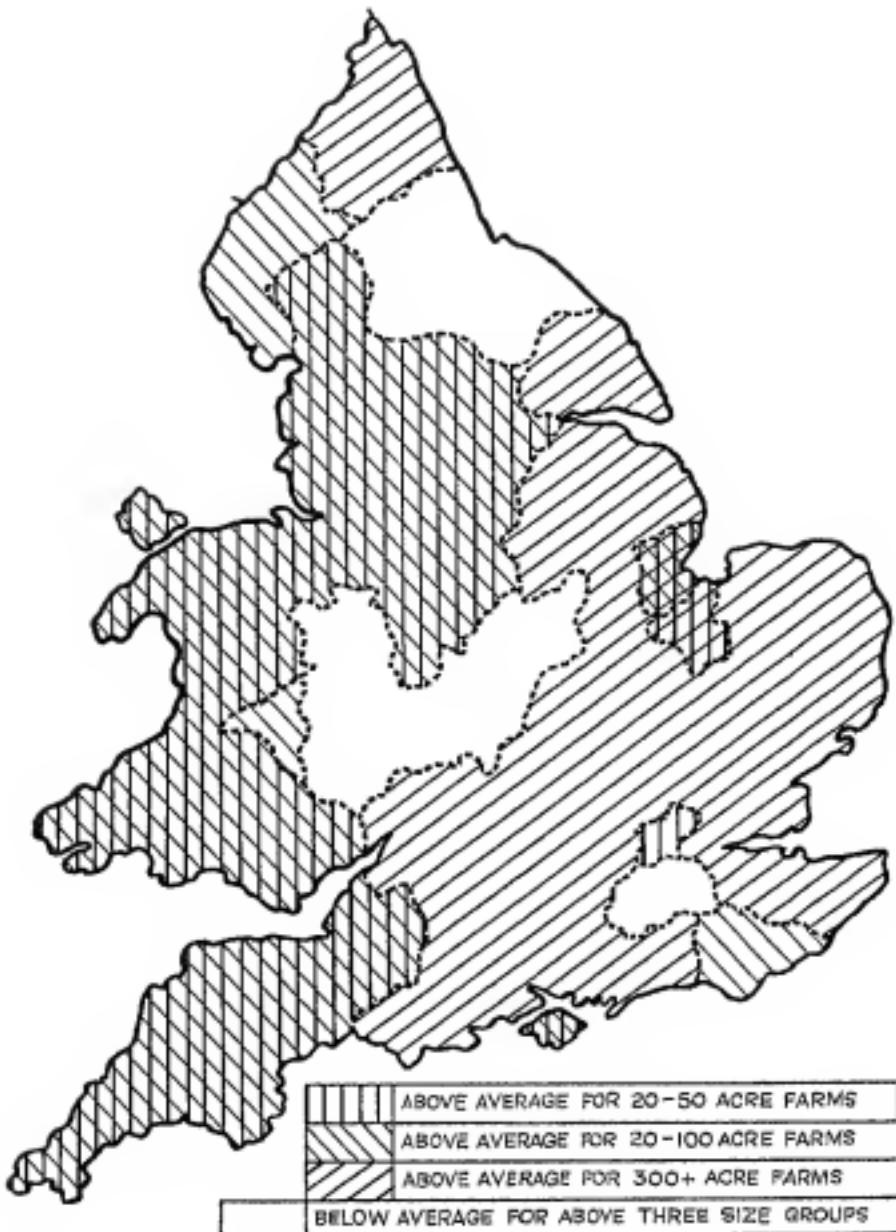
FIG. 3. *Percentage regional distribution of farms by size in England and Wales 1953*

Note: While the unshaded counties are those in which the number 100–300 acre farms are above the national average, this may be true of some of the shaded counties as well. The map is not intended to show the distribution of farms in this size range.

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Social and psychological factors

The desire to possess and work land is deep and widespread and is exemplified both by the numbers of men and women in all walks of life who adopt farming as a second profession and by the amount of uneconomic toil which people willingly expend in gardens. Farming offers independence, an open-air life, and the satisfaction which many people find in tending plants and animals. Moreover, the title of "farmer" undoubtedly carries some prestige and at the back of many people's minds is the thought that, if the worst comes to the worst, a farm offers self-sufficiency in food, a home and an occupation with no fixed retiring age.

In the nature of things, those who start farming usually do so in a small way, partly because they may not be prepared to take big risks or because even a modest farm involves a big outlay of capital for one individual. Where the main object is to obtain a country home rather than a full-time occupation, the advantages of a small farm, rather than a large one, are apparent. There are, therefore, many non-farmers looking for farms, and a considerable proportion are seeking small farms.

Within the industry there are relatively few farmers prepared to move out of farming while they still retain their physical vigour and are doing well. On the other hand, if a farmer is doing badly he will probably have difficulty in realising his assets — or perhaps in meeting his debts — if he gives up. There is certainly a strong temptation to stick as long as possible to an occupation which affords a home and subsistence. The farmer's children who are often an essential part of the labour force also add to the pressure of demand for small farms. Being brought up on a farm they have opportunities of informal training in agriculture and may well have missed the opportunity of training for other occupations.

While there are more people trying to be farmers than there are farms available, there is a movement of agricultural workers away from the land, in spite of a rise in farm workers' wages relative to general wage rates. These two trends are not contradictory. Paid work on the land offers only some of the attractions of running a farm. In particular it does not offer prestige or the security of a roof over one's head. The "drift from the land" of agricultural workers has clearly been matched by the increase in labour-saving equipment—otherwise the increases in real output which have marked the last twenty years could not have been achieved.

Inheritance and fiscal factors

In Britain, as elsewhere in Europe and in the countries settled by Europeans, private ownership has been the rule, and hence the laws and customs of inheritance have affected the present pattern of ownership of land. Sometimes the pattern of inheritance has been primogeniture; and this, strictly applied, has aided the build-up and maintenance of large properties. The custom has, however, tended to fall into disuse, if indeed it has not been legally abrogated. Even where the parental land-holding is handed down intact to one of the children, it frequently happens that the remainder of the estate, including part of the essential working capital of the farm, goes to the other children, and the real property therefore has to be mortgaged at the outset so that work can continue. In Europe as a whole, inheritance has been a major force

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tending to disintegrate agricultural properties, especially where alternative employment is scarce. Naturally this affects only property owned by the farmer, tenancies are not, of course, divided among the heirs of the farmer.

The effects of fiscal legislation are also considerable. Even with the special provisions for agricultural property, the need to find money in each generation for the payment of estate duty tends to break up the larger estates. The system of progressive income tax and surtax also diminishes the financial incentive for the larger farmers to expand their volume of business. Fiscal legislation has also helped to increase the proportion of land farmed by owner-occupiers in recent years by encouraging tenants to use their capital to buy their farms instead of increasing their scale of business.

Other factors affecting size

In general, social, psychological, inheritance, and fiscal factors all tend towards a diminishing scale of enterprise in farming. There are other factors reinforcing these pressures.

While it is true that a number of "company" farm enterprises exist, and that these figure somewhat prominently in agricultural news, they are not numerically significant. Farms are nearly always individual or family businesses; this limits their size and makes it difficult and expensive to amalgamate them. If a farm is divided, buildings and fixed equipment may appear on the separate units. These have more value to a farmer bidding for a smallholding as a separate unit than to another farmer who wishes to add to an adjacent farm already in his possession, but the major difficulties are time, place and capital. A farm is, usually more easily managed if all of it is within a ring fence. If a farmer wishes to add to his land he has to secure the addition from one of his immediate neighbours. Should the opportunity to do so occur, it is more likely to present itself in the form of a vacant farm rather than a surplus field. In order to buy an additional holding, a farmer has to raise capital in addition to that which is required in increasing amounts for the improvement and equipment of his own holding.

The personality and circumstances of the farmer also set an upper limit to the area which can be efficiently farmed in a single unit. Farm management requires almost daily snap decisions each of which can greatly affect the year's income and it is generally accepted that, with few exceptions, a farm is too large if the farmer cannot give close personal supervision to all the operations. These opinions are, however, subjective. Since the numbers of very large farms are small, the available information is insufficient to demonstrate clearly whether or not there is a loss or gain of efficiency or economy of operations in the very large firm.

While the trend towards small farms arises primarily because of the combined effect of social, historical and fiscal forces, the economic forces tending towards an increase in farm size are largely counteracted by the personal nature of farming, essentially a family rather than a company business. The economic forces have therefore tended to find expression in increasing intensity of farming operations rather than increasing size of farm. Finally, we think we should preface our conclusions by saying that we accept that the wide variety in agriculture in Britain, in types of farming, topography, soil etc., and in standards of farming practice, make it impossible to establish maximum, minimum or optimum sizes of enterprise.

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We conclude this section by making an estimate of the way in which the total agricultural production is distributed by size of farm and the relative amounts of each main product which is derived from each size group. In Table III below, the percentage distribution of some of the main farm enterprises derived from the agricultural returns (4th June, 1954) is shown by the size of farm holding.

TABLE III

Percentage distribution of enterprises by size of holding
(England and Wales 1954/55)*

Size of holding Acres of crops and grass	Dairy cattle	Total cattle	Total sheep and lambs	Total pigs	Adult fowls	Total cereals
0–20	5	5	4	22	32	2
20–100	41	33	33	30	36	19
100–300	42	44	44	31	25	44
300+	13	18	18	17	7	35

It is possible to derive a broad picture of the relative output of the farms of various sizes by weighting the individual enterprises by the value of their output in the year 1954–55. This assumes that in general the yields of the enterprises are approximately the same for farms of different size, and that the farms sell roughly the same proportion of the crops and livestock that they produce.

The results of the calculation show that holdings under twenty acres, which can be regarded as predominantly part-time farms and specialist pig and poultry holdings, produce one-eighth of the total agricultural production in England and Wales listed in Table III; those between 20 and 100 acres produce one-third and the holdings below 100 acres account for over two-thirds of the total number of adult fowls, over one-half of the pigs, nearly half of the national dairy herd, but only about one-fifth of the cereal acreage.

A comparison of these production levels with the numbers and acreages of holdings in the different size groups shows clearly the higher intensity of operations on the smaller farms; the under twenty acre holdings account for one-eighth of the output, but only one-twentieth of the acreage; those between 20–100 acres one-third of output, but about one-quarter of the acreage, and those over 100 acres over half of the output and more than two-thirds of the total acreage.

*The total production by size groups has been arrived at by weighting the actual numbers of the various livestock, and the acres of crops (excluding root crops and horticultural products) by the value of their production. This does not give a completely accurate result, but it establishes the orders of magnitude involved.

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PART III

GENERAL ECONOMIC ASPECTS

This section examines certain economic aspects of British agriculture and makes an approximate estimate of the effect of size of farm on economic efficiency. Although a great deal of valuable work on agricultural economics is done in the universities by the Provincial Agricultural Economists and by others, the only source of national data, as opposed to local or specialized economic studies, is that provided by the Farm Management Survey.

Farm Management Survey

The Farm Management Survey is a yearly analysis of the accounts of some 2500 farms, prepared under the guidance of university agricultural economists. The primary purpose of the scheme from its beginning in 1936 has been to provide measures of year to year changes in receipts, expenses, and net income. It has also provided standards of economic performance for selected types of farming which can be used in case studies of individual farms and in advisory work. Because of wide natural variations in soil fertility, climate and topography, the small size of the sample and the method by which it was selected, comparisons between large groups of farms of the same total acreage in different regions are extremely difficult to make. Comparisons between small, local groups selected from the sample are also often unreliable because net outputs, farm incomes and other important measures vary widely even between farms of the same acreage. Nonetheless, the Survey provides useful indications of differences between large and small farms.

The published data of the Survey only provides partial information about capital and the Survey does not attempt to record personal information about the farmer himself (e.g. educational background, technical proficiency, financial standing). In this study, however, we have been able to supplement information from the Survey to some extent by making detailed enquiries from a number of sources, including the Agricultural Economics Departments of several universities, one of the principal banks, and certain firms and individuals.

Farmland and rough grazing

While the classification of agricultural land into rough grazing and farmland proper is not static (since rough grazing can be improved and farmland can revert to an uncultivated state or disappear because it is used for housing or industrial development) the total area of farmland remains fairly constant—no distinction is made here between farmland proper and rough grazing. The acreage figures used are therefore figures of total acreage, following the Farm Management Survey classification of farms by size groups. In certain instances, however, where particular figures derived from sources in which the concept of "adjusted acres" is used, a different basis is adopted. In this, the value of rough grazing is expressed in terms of its value as average pasture; total acreage in these cases is therefore the sum of the acreage of farmland proper and the "adjusted acreage" value of the rough grazings.

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Type of farm—Method of classification

As the information given in the Farm Management Survey publications is our main source of data, we have followed the method of classification of farms and terms used in these publications. A list of definitions extracted from "Farm Incomes in England and Wales" is at Appendix A.

It may be helpful to indicate briefly the type of farm with which the report is concerned. The primary basis of classification is by districts within which a particular type of farming tends to predominate. These districts are classified on the basis of four main farming types: dairying, arable, livestock and mixed. We have, therefore, two methods of grouping in the Farm Management Survey sample: an area type-grouping which provides information about results by type of farming, and an acreage grouping, which enables comparisons to be made by size of farm.

Apart from the four basic categories noted above, a fifth category, that of specialist farms, is also included in the Survey. In this are market gardens, fruit farms, poultry farms, etc. We have not attempted to deal with the economics of such farms.

Representativeness of the Farm Management Survey sample

Figure 4 shows the relationship between the numbers of holdings by size in England and Wales as a whole obtained from the Agricultural Census figures for 1955 and the corresponding numbers of farms by size in the Farm Manage-
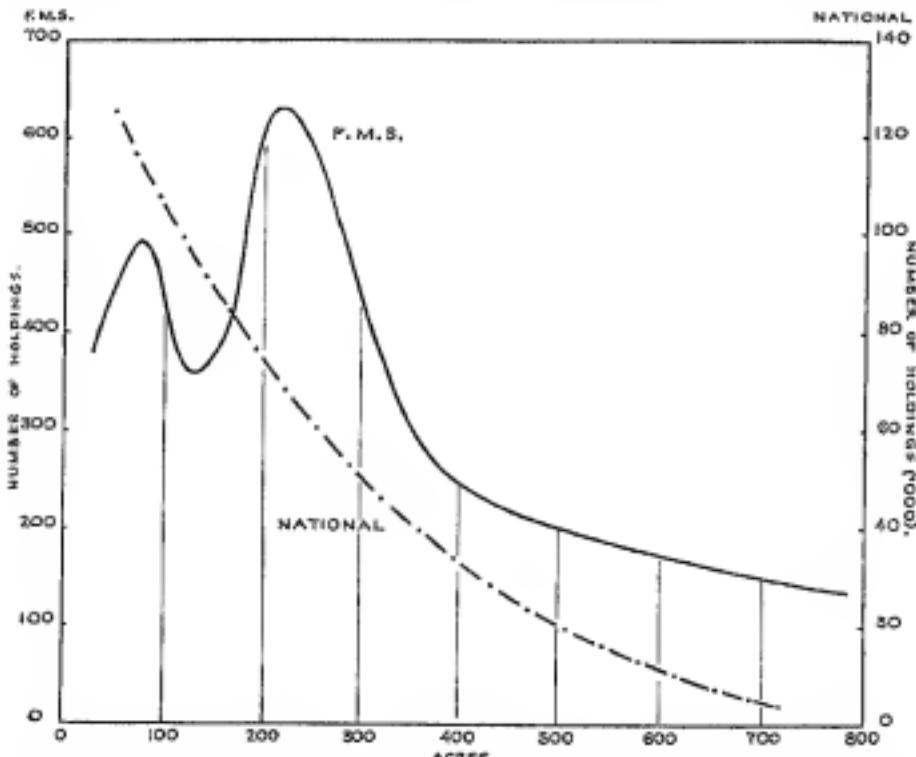

FIG. 4. *Comparison of acreage and numbers of farms in the F.M.S. sample and the national size pattern of agricultural holdings (England and Wales) 1955*

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ment Survey sample. The Farm Management Survey sample includes many more medium-large farms (100–300 acres) than would be justified if the sample was intended to be a replica of the pattern of British agriculture.

Table IV below shows the numbers and percentages of farms by type in the sample.

TABLE IV

Numbers of farms by types in the size groups of the F.M.S. sample
(1955–56 England and Wales)

(s.g.=size group ;   t.g.=type group)

	Size Groups (total acres)											
	0–50		50–100		100–150		150–300		300–500		500+	
Type	% of s.g.	% of t.g.	% of s.g.	% of t.g.	% of s.g.	% of t.g.	% of s.g.	% of t.g.	% of s.g.	% of t.g.	% of s.g.	% of t.g.
Dairying ..	38	20	34	33	26	19	18	24	5	3	4	1
Arable ..	26	21	15	23	12	13	11	21	20	17	12	9
Mixed ..	22	8	28	18	32	16	39	33	44	16	46	9
Livestock ..	14	7	23	18	30	18	32	34	31	14	38	9

Within the sample, the proportion of dairy farms in the larger size groups is very much smaller than in the smaller size groups, while the proportion of mixed farms increases steadily with size of farms, as does the proportion of livestock farms. The agricultural census does not provide comparable statistics for all farms but there is no reason to suppose that the variations within the sample are markedly different from the type-structure of the nation's agriculture as a whole.

RELATION OF OUTPUT TO FARM ACREAGE*

Figures of both gross and net output are included in the Farm Management Survey analyses; these quantities are defined in Appendix A. Briefly, gross output is the total revenue received from the agricultural operations of a farm (including subsidy payments) less livestock and livestock products bought from other farms. Net output is gross output less the cost of purchased seeds and feedingstuffs, and is used here in a specialized sense: it does not carry the usual meaning of value added after *all* expenditures have been deducted.

The significance of the difference between gross and net output figures may be seen in Fig. 5 which shows gross and net output per 100 acres and the cost of seeds and feeding stuffs per 100 acres for each size group, for the year 1955–56. Taking dairy farms as an example, the steep fall in gross output per 100 acres up to the 50–100 acre size group is almost exactly paralleled by a corresponding fall in the value of purchased seeds and feedingstuffs. Livestock farming follows the same pattern, though with proportionately less expenditure on feedingstuffs in all the size groups. With mixed and arable farms, the fall in gross output between the under 50 and the 50–100 acre farms is less marked, and this again is matched by a correspondingly smaller fall in purchases of seeds and feedingstuffs. The smaller farm relies to a great extent on purchased feedingstuffs to

*This and subsequent paragraphs in Part III refer to England and Wales. The economic data for agriculture in Scotland have been analysed separately by the Agricultural Economics Branch of the Department of Agriculture for Scotland; the results are set out in Appendix E.

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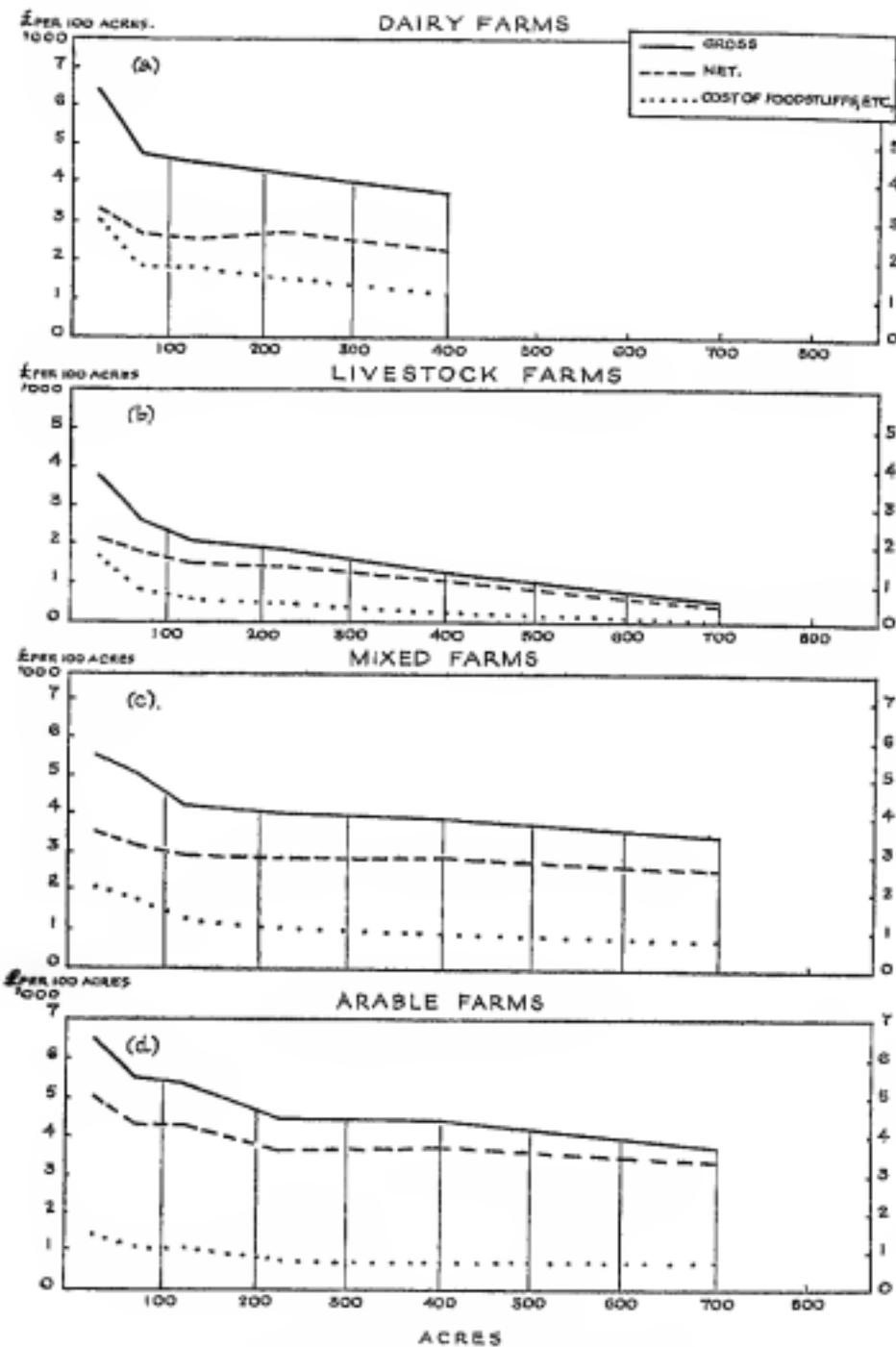
Fig. 5. *Gross and net output per 100 acres*
(F.M.S. sample, England and Wales 1955-56)

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obtain a high gross output: for the year 1955–56 dairy farms of under 50 acres required an expenditure of over £90 on feedingstuffs to achieve £100 of net output, while those of 150 and more acres required an expenditure of over £65 on feedingstuffs to obtain £100 of net output; the amount required for feedingstuffs in proportion to the net output achieved is much less for mixed and arable farms. Whereas holdings of less than 100 acres used, for every two acres, the equivalent of one additional acre in purchased feed, on holdings of 100–300 acres the proportion was three to one, and on holdings of over 300 acres the proportion was four to one.

RELATION OF INPUT TO FARM ACREAGE

The Farm Management Survey classifies total farm expenditure in terms of livestock purchases, labour, feedingstuffs, fertilisers, seeds, rent and rates, machinery depreciation and repairs and miscellaneous items. These items are all straightforward except for labour costs for which two supplementary sets of figures are given. First, "paid labour " includes all regular, casual and contract labour, together with the value of payments in kind and the cost of family labour (other than that of the farmer and his wife) whether paid or unpaid; it also includes the salary of a farm manager if one is employed. Secondly, an estimate of the value of the labour of the farmer and his wife is given; this is based on the farmer's own statement of the proportion of the year worked, costed at standard earnings for agricultural workers, with no allowance for the managerial content of the work. On small farms the farmer's own labour is an important element in input, and a comparison between small and large farms which does not take account of the value of the farmer's own labour will, therefore, be heavily distorted.

The relation of total labour costs (paid labour and the estimated cost of the farmer's and his wife's labour) is compared with size of farm for the four types of farming groups of the Farm Management Survey sample for the year 1955–56 in Fig. 6; the total labour input per acre falls steadily with increasing size of farm and, in all types of farming, the small farm relies very heavily on the unpaid labour of the farmer and his wife. For all farms below 50 acres, this accounts for more than half of the total manual labour input, whereas in farms of 500 acres the farmer's labour is hardly a significant factor except in the case of large livestock farms where it still amounts to about a third. The acreage at which 50 per cent. of the total labour input is the farmer's labour, decreases steadily from livestock farms through dairy and mixed farms to arable farms.

The relative labour inputs for the four types of farm is also shown in Fig. 6. Over all size groups, arable farms have the highest labour input per acre, followed by mixed, dairy and livestock farms in that order; this is similar to the relation of output to acreage shown in Fig. 5. In considering the relation of total input to acreage we must therefore add the value of the farmer's own manual labour.

The variation of total input per acre with acreage is shown in Fig. 7. It is not possible, however, to make allowances for the value of one important element, the farmer's management skill in Fig. 7 excludes this factor except on those farms employing paid managers, which are, of course, mainly the larger farms.* Moreover, it is not possible to take account of the "risk-bearing" element as the

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*The number of farms employing a farm manager in the Farm Management Survey sample is, however, very small.
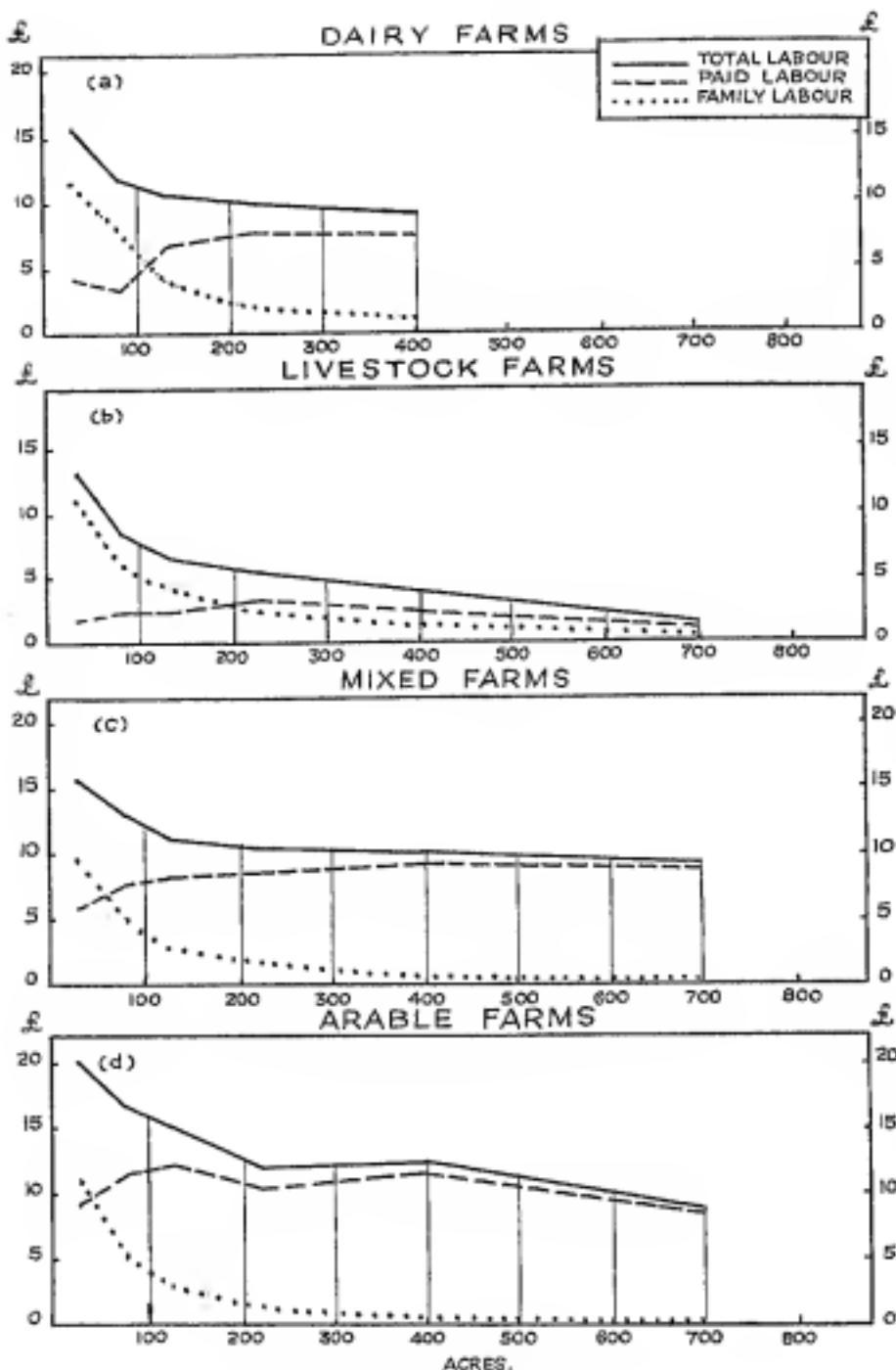
FIG. 6. *Labour costs per acre*
(£ per acre)

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published data of the Farm Management Survey do not include any information on risk capital.

Subject to these qualifications Fig. 7 shows that the total value of the input per acre falls steadily with increasing size of farm. The mean of all type groups at about 50 acres is about half that for small farms up to 50 acres. There is very little difference in input between mixed, arable and dairy farms for each size group, but the input per acre on livestock farms appears to be only half that of the other types of farms. This relation is more or less independent of farm size.
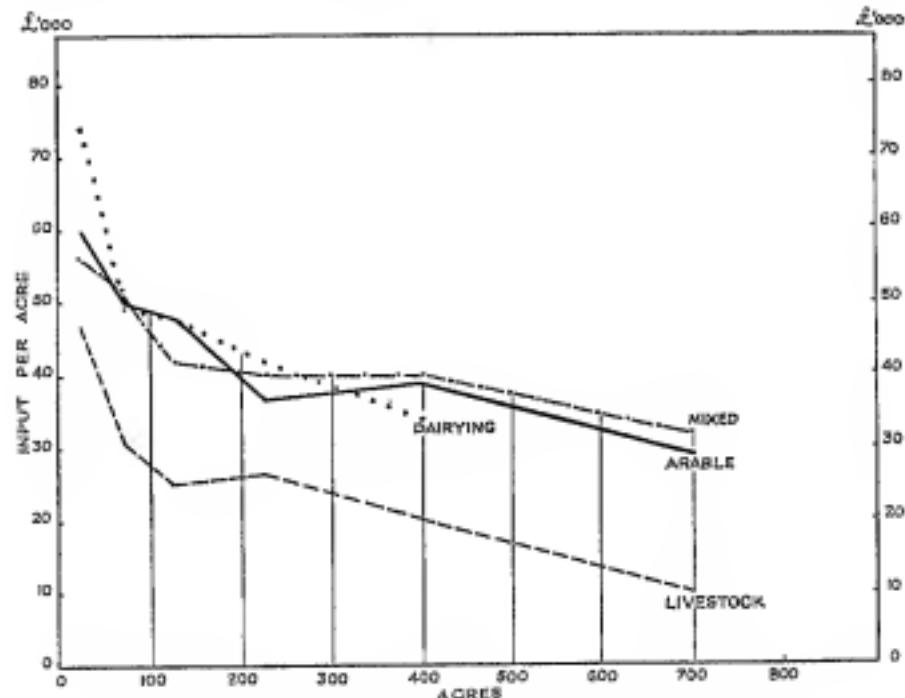
Fig. 7. *Total input per acre, including value of farmer's own labour*
(F.M.S. sample England and Wales 1952-56)

RELATION OF NET INCOME TO FARM ACREAGE

Net income per farm† may be regarded as the excess of total revenue over total expenditure adjusted for the difference between opening and closing valuations of livestock and crops. It is therefore the simplest measure of profitability of farming operations. It can be regarded as a measure of the total net material reward to the farmer and his wife for their manual labour, the capital invested and the degree of technical and managerial skill applied to the farm. In the analysis of the Farm Management Survey data therefore, no allowance is made in computing net income for the cost of the farmer's or his wife's labour, physical or managerial, nor for any return on his capital, since we are concerned to show how the *total* reward to the farmer varies with size of farm.

The relationship between net farm income and acreage averaged over the

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†For definition, see Appendix A.

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years 1952–1956, for the four main types of farming is shown in Fig. 8. As expected, net income rose steadily as the size of the farm increased. For farms up to 50 acres in size, irrespective of type,* the average net income for these years did not exceed about £500 per annum; in the case of livestock farms, considerably less than this was received. As these figures (if they are at all representative) refer to the total reward to the whole family, the actual return from a few acres is very poor. Apart from the non-material benefits of owning a small farm the average farmer of under 50 acres is no better rewarded than a farm labourer.
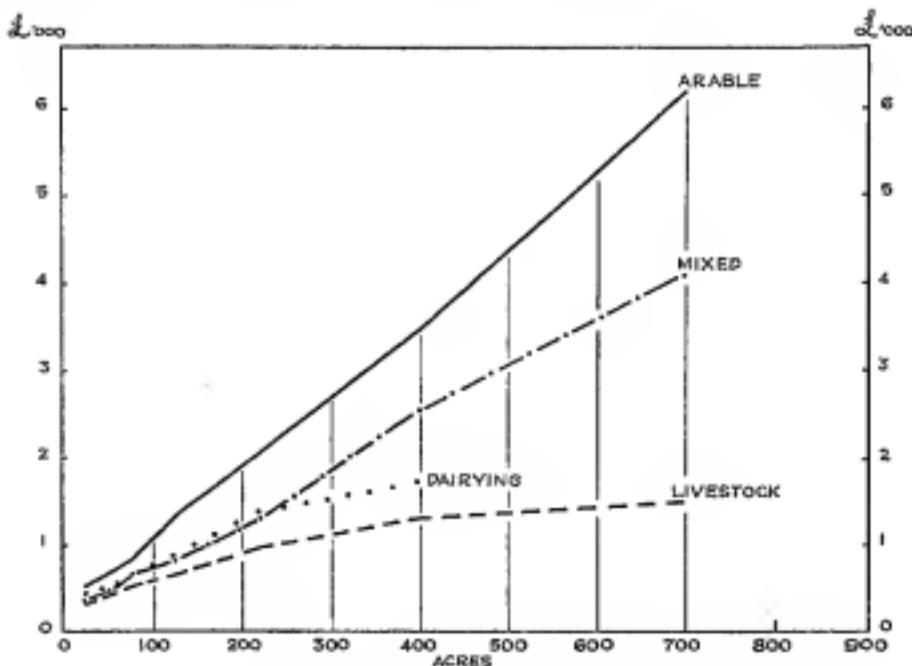
FIG. 8. *Average net farm income*
(F.M.S. sample England and Wales 1952-56)

There appear to be important differences between types of farming. While incomes from arable and to some extent mixed farms appear to increase fairly regularly with increasing acreage, both livestock and dairy farm incomes increase much more slowly. The reasons for this are complex, but for arable farms the actual extent of the land appears to be the main factor determining the value of the total annual production, while, in other types of farming, land continues to play an important part, other factors, such as labour utilization, availability of capital and quality of the land, exert a greater influence.

If, from the farm income figures quoted above, an allowance for interest on capital employed is subtracted from net farm income, the residual reward for labour and management skill on small farms is very small indeed. It is doubtless true that the residual figures so obtained are on the low side and that there are offsetting factors; the small farmer possibly makes sales which do not figure in the accounts. Again, the total family income from small farms is in fact often

*Except possibly for specialist farms, which were not examined.

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higher than the computed net income from the farm business because family labour, apart from that of the farmer and his wife, is charged at current rates, irrespective of whether it is paid. Moreover, it is thought that the small farmer commonly obtains a substantial part of his working capital indirectly by means of extended credits, and that this results in a disguised "interest" payment which is not accounted for separately in arriving at net income. However, even when these factors are allowed for, the small farmer's material reward clearly remains meagre. Since the number of small farms is not diminishing rapidly the sociological factors discussed earlier must exert a considerable influence.

Year-by-year fluctuations of income

While illustrating the general trend of incomes by size and type of farm, five-year-average incomes discussed above conceal the effect of varying external conditions, e.g. climate and the level of prices and payments to the farmers, which are not directly related to such factors as farm area and efficiency. Since farm incomes as calculated are based on actual cash receipts for farm products, they are influenced by two sets of external factors, one affecting the total production and the other the price (including subsidies and grants) received per unit produced. In practice both sets of factors are linked together, since price per unit is indirectly affected by amount produced, if not in the current year, then in subsequent years by changes in grants or subsidies. Also, since the income figures are net, that is, are the balance of receipts over expenditure, they are influenced by similar factors operating on the input side as well. For example, an increase in the price of feedingstuffs may result in a decreased net income, either directly (if more money is paid out for the same amount of input) or indirectly (if a smaller amount of feedingstuffs is bought and this results in a lower yield). Again, the variation in climate from year to year obviously affects the total volume of output and therefore net income. A complete analysis of the manner in which external factors of climate, prices and subsidies, etc., affect farm incomes would be extremely complex, and it is unlikely the published information is available to make the attempt worth while.

The total effect of the external factors that affect farm income may, however, be seen by considering the annual fluctuations. In Table B below, the changes in net incomes for the four main farm types from 1952 to 1956 are shown by size groups. The sample of farms does not remain constant as there is a degree of "wastage" and movement between types over the years. An allowance has therefore been made in Table V to correct distortions due to sample changes of this kind. Among the arable farms there has been a general upward movement of incomes, while in livestock farms the general trend seems to have been downward with the occasional seasonal fluctuations probably due to climatic and price changes. For dairy farms the trend is more difficult to determine, incomes rose to a peak in 1953–54 and thereafter fluctuated. For mixed farms the annual fluctuations tend to be damped down (perhaps because a good year for one crop is usually a bad year for another) but with a slight tendency upward.

Variations of net incomes within size groups

There are a number of farms of under fifty acres which earn up to £2000 per annum and a few which earn £3000 or £4000, but the mean of the Farm Management Survey sample for farms up to fifty acres is about £500 per annum. A

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TABLE V

Net farm incomes (1952–56)
(F.M.S. sample, England and Wales)
(£'s per farm)

DAIRYING

Size Groups (acres)		1951–52	1952–53	1953–54	1954–55	1955–56
0– 50	.. ..	390	450	560	450	480
51–100	.. ..	460	580	800	610	630
101–150	.. ..	490	890	1100	850	820
151–300	.. ..	1100	1300	1700	1300	1300
301–500	.. ..	1300	2300	2600	1400	1500

Size Groups (acres)		1951–52	1952–53	1953–54	1954–55	1955–56

LIVESTOCK

Size Groups (acres)		1951–52	1952–53	1953–54	1954–55	1955–56
0– 50	.. ..	270	350	390	290	340
51–100	.. ..	440	610	680	590	550
101–150	.. ..	610	820	870	630	520
151–300	.. ..	870	1100	1200	980	790
301–500	.. ..	1100	1500	1600	1100	800
501+	.. ..	1500	1700	1600	1300	1200

MIXED

Size Groups (acres)		1951–52	1952–53	1953–54	1954–55	1955–56
0– 50	.. ..	580	440	480	440	520
51–100	.. ..	420	540	610	520	700
101–150	.. ..	610	740	970	730	760
151–300	.. ..	970	980	1300	1200	1100
301–500	.. ..	2200	2300	3000	2700	2600
501+	.. ..	3500	3300	4200	4400	4000

ARABLE

Size Groups (acres)		1951–52	1952–53	1953–54	1954–55	1955–56
0– 50	.. ..	440	460	470	480	630
51–100	.. ..	770	760	870	770	990
101–150	.. ..	1200	1200	1300	1400	1400
151–300	.. ..	2100	1900	2300	1900	2300
301–500	.. ..	3300	3000	3600	3000	3500
501+	.. ..	5600	5100	7200	4300	6300

NOTE.—The figures in this table have been derived from the two-year identical samples published in the report "Farm Incomes in England and Wales."

special analysis of the distribution of net income on farms of the different size groups has been made for the year 1954/55, Table VI.

The figures set out in Table VI are presented graphically in Fig. 9, in which the spread of incomes for each size group is shown by type of farm. The losses (i.e. negative incomes) could not be included since their amounts are not known. The following inferences may be made from Fig. 9.

(a) incomes from all size groups show a wide spread about the mean income for the group. This spread tends to increase with the size of farm, but does not appear to be related to type of farm.

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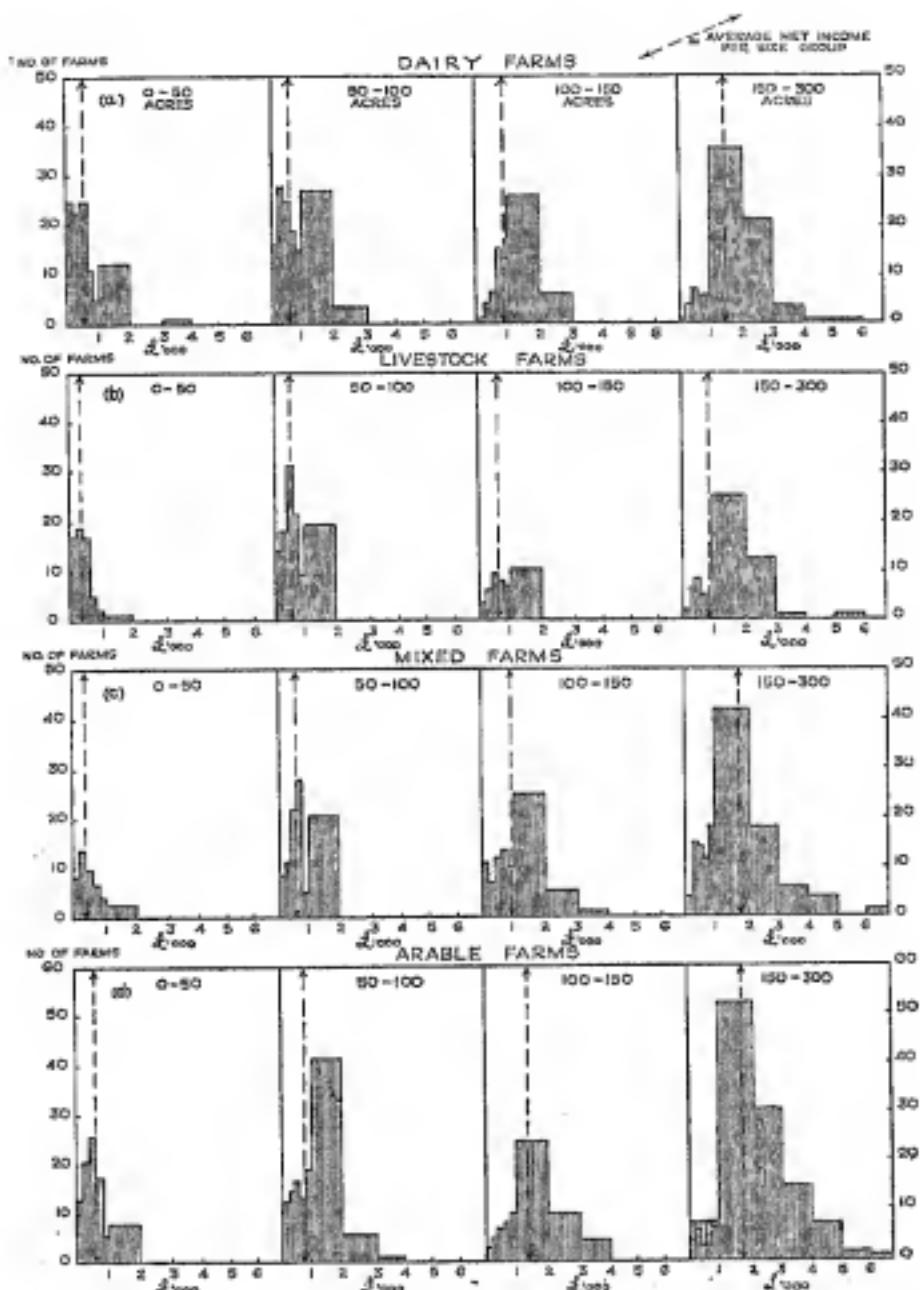
Fig. 9. *Distribution of farm income in size groups*
(F.M.S. sample 1954-55)

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(b) the pattern of the spread of incomes follows the same general tendency in each size group, except that for the larger farms, the fall-off in numbers of farms earning more than the average is less marked than in the smaller size groups.

(c) as between type groups, the pattern of spread of incomes follows the differences in mean incomes noted above, i.e., arable farms provide the best opportunities for higher incomes and livestock farms the worst, with dairy and mixed farms occupying an intermediate position.

TABLE VI

Distribution of farm incomes
(F.M.S. sample, England and Wales 1954/55)

Income range—£	Numbers of farms by size group (acres)			
	0–50	50–100	100–150	150–300
Loss	36	44	31	20
Under 200	64	51	18	11
200–399	77	72	22	31
400–599	77	94	34	32
600–799	40	83	42	31
800–999	17	48	40	34
1000–1999	24	108	85	154
2000–2999		18	21	82
3000–3999	1	1	5	26
4000–4999		1	—	12
5000–5999			—	4
Over 6000		—	—	1

Evidently, therefore, there is not only a greater chance of earning high incomes from a large farm, but also the opportunities themselves are more diverse. The great majority of the small farms fall within a comparatively narrow range of incomes, indicating that for normal levels of skill, management ability etc., the earning possibilities of small farms are fairly narrowly prescribed. It is only the exceptional small farmer who can achieve double the average net income for his size group. The 300 acre farm, the earning possibilities are much wider, and a significant number earn treble the mean. On the whole, the number of below-average farms (or farmers) in this group is a smaller proportion in the smaller size groups, but it is still substantial.

MEASUREMENT OF ECONOMIC EFFICIENCY

An objective standard of economic efficiency is required in order to compare the results of farming operations as a whole and to show the influence of acreage on the economic factors of farm production. In devising a suitable index of economic efficiency, both outputs and the various inputs that go to produce them must be taken into account. An absolute standard of measurement is hardly possible, output and input calculated on a basis of cash values vary with prices; this disadvantage must be accepted if any comparisons at all are to be made. Fortunately, when comparing production, prices do not vary very much. Hence a comparison of outputs and inputs on a cash value basis reflects changes of the volume of outputs and inputs, provided the farms have roughly similar physical outputs. Some distortion does, however, occur if, for example, the "fixed charges" of the farm (rent, interest, etc.) make up a very different

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proportion of the total average input in each case. Moreover, as the cash receipts include subsidies, the comparison tells us nothing about the economics of production in any absolute sense, but only indicates (within the limits stated above) the relative economic position of farms within the present framework of subsidies and guaranteed prices.

Output/input ratio

The most suitable measure of economic efficiency is to compare the cash value of output with the costs of the related inputs. In this way, the relative efficiency of farms of different sizes can be measured by the output per unit of input, although for the reasons given above such comparisons must be made with care. One major difficulty is whether or not to make an allowance for the farmer's manual labour in determining the total value of input. If no value is given for this item, the balance of output over input represents the net income to the farmer to reward him for his manual and managerial effort, and for his capital. However, such a basis would seriously under-estimate the manual effort necessary to produce each unit of output on a small farm relative to that on a large farm, and the output due to the farmer's manual effort would in effect be credited to other factors of production. In measuring the efficiency of the use of resources (human or otherwise) it is therefore desirable to include the value of the farmer's manual labour as an input item. This recognizes the fact that the farmer himself is one of the most important resources used in agriculture, especially on smaller farms; he has been valued at the going rate for hired agricultural workers. The balance of output over input then represents the reward to the farmer for his managerial efforts and capital invested. Accordingly, in the calculations of output/input ratios in this report the value of the manual labour of the farmer and his wife has been included as an input item, except where otherwise stated. The assessment of the amount of work put in by the farmer and his wife can, of course, only be ascertained roughly and therefore calculations based on these figures are only approximate.

The second difficulty is to decide what is the most useful measure of output for our purpose. The quantities described by the terms "gross output" and "net output" differ by the amount spent on seeds and feedingstuffs, these items having been subtracted from the gross output to arrive at the net figure. Both gross and net output therefore contain an element of profit attributable to the processing of purchased feedingstuffs, but in the case of net output the cost of achieving this profit is removed. Feedingstuffs are, however, an important input, particularly in the case of small livestock and dairy enterprises, and their cash value is included in the input values. For these reasons gross output has been used as the measure of output.

The gross output/input ratio calculated on a five-year average for the years 1952–56 for farms in the Farm Management Survey by size and type is shown in Fig. 10. The results may be summarized as follows:

(a) All types of farm (except dairy farms above 200 acres) show a steady increase in the value of output per £100 of input as acreage increases. For arable, mixed and livestock farms the increases from 100 acres to 500 acres are roughly the same (about £15 per £100 of input).

(b) The rate of increase is greater in the smaller than in the larger size ranges for all types of farm, and it is also in the size groups below 100 acres that the difference in the ratio between types of farms is greatest.

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(c) The figures show that on farms of under 50 acres, for every £100 of input (including the value of the labour of the farmer and his wife) arable farms produce on the average £110 worth of output, mixed and dairy farms £104 and livestock farms £96. Since the output/input ratio as calculated makes no provision for any return on the farmer's capital or his managerial reward, the average farm of under fifty acres is probably below the economic level of operation, even at the present level of subsidies.
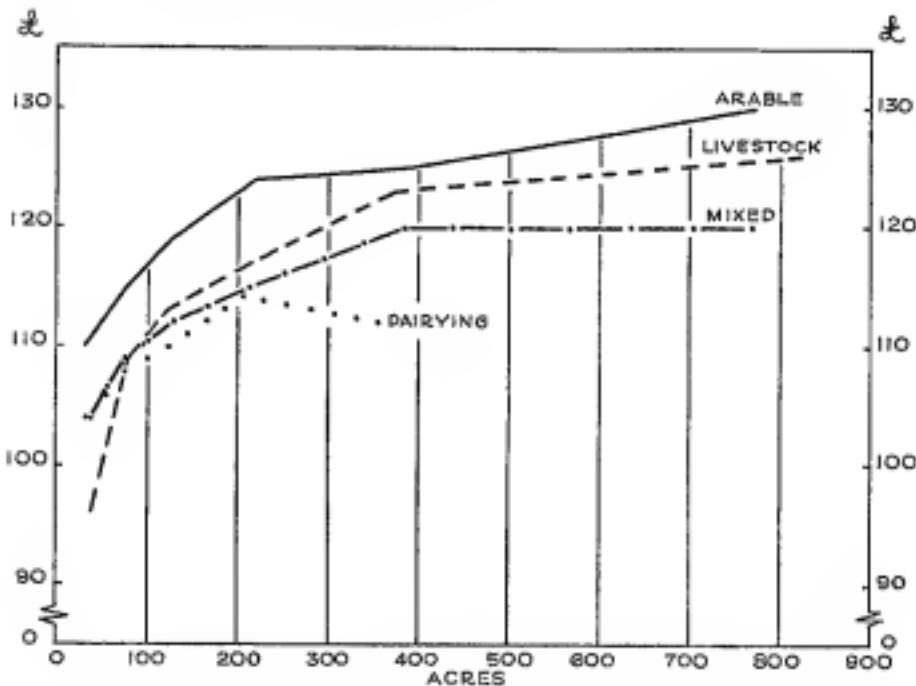
FIG. 10. *Average gross output per £100 input by size and type of farm*
(F.M.S. sample England and Wales 1952-56)

The five-year average tends to conceal a worsening situation from 1952 to 56 in the whole group of livestock farms. For 1955/56 the ratio for livestock farms is well below the other types of farms for all size ranges. Between 1952 and 1956 the ratio for livestock farms shows a steady fall; the ratio for 1955/56 for the medium and larger size groups is, for example, lower than the five-year average by about £10 to £15 per £100 of input. However, more recent figures indicate that the trend for livestock farms has been reversed since 1956.

In interpreting the output/input ratio as a measure of economic efficiency, the following should be borne in mind, as well as the limitations noted above. The ratio is the result of dividing the sum of the outputs by the sum of the inputs, giving the average efficiency over all the inputs and all the outputs; the ratio is in general larger for the larger farms. However, to draw conclusions from the ratio, it is necessary to know whether the additional units of output resulting from additional units of input will be greater in one group of farms than another, i.e. whether the marginal efficiency is greater for one group than another; this is particularly important if additional investment of natural resources in the agri-

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cultural economy is contemplated. Unfortunately, it is impossible to estimate marginal efficiency with present data.

At the same time, it is reasonable to assume that, other things being equal, the marginal return on a farm with a high intensity of production is less than that on a farm with a lower intensity of production, owing to the law of diminishing returns. Small farms, however, are in general more intensively operated than larger farms. This being so, we may justifiably assume that the lower average efficiency of small farms shown by the output/input ratio indicates a lower marginal efficiency.

<center>RESOURCE USE</center>

It is possible to throw some light on the reasons for the trend in the output/input ratio referred to in the previous section by considering how the several inputs (i.e. the resources used) vary with size of farm. A convenient basis for such a comparison is obtained by a breakdown of the input used to produce £100 of gross output. In default of a national analysis of input per unit, we have used two samples, one from Wales and the other from East Anglia. The samples comprise very different types of farming. The Welsh sample is of 401 farms which are either arable, mixed or livestock enterprises, and there are a number of poor land farms in each category. The East Anglian sample, on the other hand, consists of 240 farms which are predominantly arable in type and are on very much better land. The main differences in type of farming in East Anglia is between "upland" farms* which practise the normal type of arable cultivation (i.e. the main crops are cereal) and fen farms which, having a very rich alluvial soil, are able to adopt a high intensity type of farming based on sugar beet and potatoes as the main cash crops. None of the latter is represented in the East Anglian sample.† The samples contain a wide spectrum of farm types, ranging from the large and extensive livestock-rearing enterprises on poor land in Wales to large East Anglian arable farms, and from small intensive Welsh dairy farms on good land to the small intensive upland arable farm in East Anglia.

The detailed results for Wales and East Anglia are set out in Appendices C and D. The methods of analysis used differ slightly in the two areas and so it is not possible to combine these data quantitatively. However, certain trends are common to both and these are thought to be representative of the average conditions.

Composition of input by size of farm

The basic information is shown in Table C-II of Appendix C and Table D-I of Appendix D. The Welsh figures refer to inputs per £100 of production while the East Anglian figures are for inputs per £100 of gross output. The measures differ by the amount of direct Government grants paid to farmers (as detailed in Appendix C), but there is no fundamental difference between them, although the actual values of input measured against the two standards are not strictly comparable. The composition of inputs may be seen from the Appendices. That the composition of output, and therefore of the inputs concerned, tends to vary with the size of farm. In the East Anglian sample the smaller farms are those in

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*The term "upland" is used in a special sense in East Anglia, and should be taken to refer to all areas other than the fens and silt lands.
†Certain data on the latter farms are, however, included in Tables III and IV of Appendix D.

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which a larger proportion of gross output is derived from livestock, compared with the larger farms, whilst in Wales, the smaller groups include a higher proportion of the better land intensive farms the larger. The inputs which vary most between small and large farms, are farmers' own labour, feedingstuffs and (to some extent) fertilizers. These variations together with the variations of total labour and total inputs per £100 of gross output or production are shown in Table VII.

TABLE VII

Variation of inputs per £100 production (Wales) and £100 gross output (East Anglia)

WELSH SAMPLE

Size Groups acres	Farmer's own labour £	Total labour £	Feeding-stuffs £	Fertilizer £	Total Input £
0— 99 ..	20	33	34	4	106
100–199 ..	13	33	26	5	102
200+ ..	8	29	22	6	97

EAST ANGLIAN SAMPLE

Size Groups acres	Farmer's own labour £	Total labour £	Feeding-stuffs £	Fertilizer £	Total Input £
20– 50 ..	15	29	30	4	95
50–100 ..	7	27	23	5	89
100–150 ..	5	28	19	5	89
150–300 ..	4	24	19	6	84
300+ ..	1	25	15	7	83

The general inference is that the total input required to produce £100 of production or gross output falls as size of farm increases. The difference between the actual figures for the two samples is due partly to the fact that direct Government grants are excluded from the production, but not from the gross output calculations, and also to the fact that the Welsh sample is by and large concerned with much less profitable types of farming than the arable farms of East Anglia. The following are the trends in the more important elements of input per unit (£100) of output (gross output or production as the case may be):

(a) *Labour*. The cost of labour per unit of output is reasonably constant over the range of farm sizes in both samples. There is a tendency for it to fall with increasing acreage on the larger farms, but the differences are comparatively small. There is, however, a very large drop in both samples in the contribution of the farmer's own labour per unit of output as size of farm increases. This is probably the most significant feature brought out by the analysis. It illustrates the importance of taking account of this factor in calculations of relative economic efficiency, resource use, etc. If the value of the farmer's own labour is excluded, its contribution to output can be imagined as being spread over all the other inputs, but as its contribution to

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output is proportionately so much greater for the small farm, comparisons will be severely distorted.*

(b) *Feedingstuffs.* Both samples show that the cost of feedingstuffs per unit of output declines steeply as the size of farm increases. While in East Anglia this may be partially explained by the greater proportion of output due to livestock on the smaller farms, the trend is clearly repeated in Wales even when major differences in the composition of output are ruled out by considering livestock or dairy farms separately as has been done in Table C-IV of Appendix C. This must be due, at least in part, to the fact that the larger farmer grows more of his feed on his own land.

(c) *Fertilizer.* In both samples, nearly double the amount of fertilizer is used to produce £100 of output in the larger size groups as compared with the smaller. Small farms, however, have proportionately more farmyard manure available and thus may account for some part of the difference. The remainder is accounted for by the different type of commodities produced on small farms. The small farmer grows proportionately fewer crops, and pigs and poultry do not use fertilizer.

(d) Other types of input show little or no change with changes in size of farm.

Relation of resource use to type of farming and quality of land

These factors are, of course, interrelated, but available data does not permit a complete analysis of the relationship. Tables C-IV and C-V provide some comparative figures in the Welsh sample. The East Anglian sample is homogeneous (all upland arable farms) and tends to throw further light on the question, although the figures of D-III and D-IV do provide some indication of the greater profitability of the highly intensive rich farmland farms compared with the more normal type of arable cultivation.

Table C-V shows that "poor land" farms‡ of all types in the sample require on the average more than £100 of inputs to achieve £100 of production,† i.e. they have a negative profitability after charging for the manual labour of the farmer and his wife. Comparing small "better-land" farms of the three type groups represented in the Welsh sample, the livestock rearing group is shown to be on the average the least viable, with little to choose between the mixed and dairy groups. For larger farms the order is reversed; dairy farming is the most profitable, followed by dairy and mixed groups.

Pattern of resource use

Dairy and mixed farms require more labour than livestock-rearing farms, while the contribution of purchased feedingstuffs to output decreases from dairying to mixed to livestock farms. Poorer land is associated with an increased

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use of feedingstuffs except where changes in the nature of the output also occur (e.g. from pigs and poultry to sheep and beef cattle).

Input per acre and changes in farming method

Table C-III shows that the average input per acre for farms up to fifty acres is nearly four times that for farms over 200 acres; cash inputs per acre may be high because of a particular choice of product. Some products require the use of more land to produce a unit of output than others. For example, small dairy farms, which use a comparatively large amount of feedingstuffs, may require about two acres to produce £100 of output compared with about four and a half acres of livestock rearing farms. These relationships between type of product, level of cash inputs, and acreage per unit of output are not necessarily immutable. For example, it is possible, by increasing the amount of feedingstuffs used, to increase the intensity of a livestock-rearing enterprise, thus reducing the amount of land required per unit of production. Equally, the amount of cash input on dairy farms could be reduced by relying more on grass and less on feedingstuffs, which would, however, require more land or possibly more intensive cultivation of grass.

Overhead and variable costs

The output/input ratio reflects the general trend that economic efficiency increases with size of farm, provided that the manual labour of the farmer and his wife is taken into account. Analysis of the various elements making up input shows that other factors, including type of farming, intensity of operation and land quality, also affect the relative economic position of small and large farms, and to some extent mask the so-called "scale effect" in farming. It is possible, however, by dividing input into overhead costs and variable costs to obtain some idea of the reasons for the trend disclosed, and of the mechanism of its operation.

Overhead costs are those which are unavoidable on the farm concerned, while variable costs are those which the farmer can influence by changes in the nature and scale of his operations. To some extent the category into which a particular cost falls is a matter of arbitrary choice. In this report, however, overhead costs include rent, the farmer's own labour (but unpaid family labour), interest, depreciation and sundries, while variable costs consist of feedingstuffs, fertilizers, seeds, paid labour, contract costs, fuel and repairs. Full details for both the Welsh and the East Anglian samples are given in Table C-VI of Appendix C and in Table D-II of Appendix D. The data are comparable, since both are calculated on a gross output basis. Other differences in detail between the two analyses are small and may be ignored.

The results are summarized in Fig. 11. Even though farming practice in East Anglia and Wales are very different, the results are remarkably similar in both samples. The variable costs per unit of output vary hardly at all with size, while the overhead costs decline steeply with increasing size of farm, showing that the "scale effect" previously noted is due to the element of overhead costs which must be allocated to each £100 of gross output. This means that the small farmer has an insufficient volume of output to enable him to spread his overhead costs adequately. His own and family labour is a particularly important component of these costs. This is confirmed by the analysis of overhead costs by type of farm for the Welsh sample. The contribution of overhead costs to output declines not only with size but with poorer land and with

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type of farming, the overhead costs for livestock rearing enterprises being generally rather greater than for other types of farming; both poor land and concentration on (small-scale) livestock-rearing tend to be associated with low output.

The available evidence therefore shows that the lower economic efficiency of small farms compared with large farms is due not to a lower standard of efficiency in the choice or use of those resources which depend upon the farmer's operational decisions. It is rather, that the small farmer cannot make efficient use
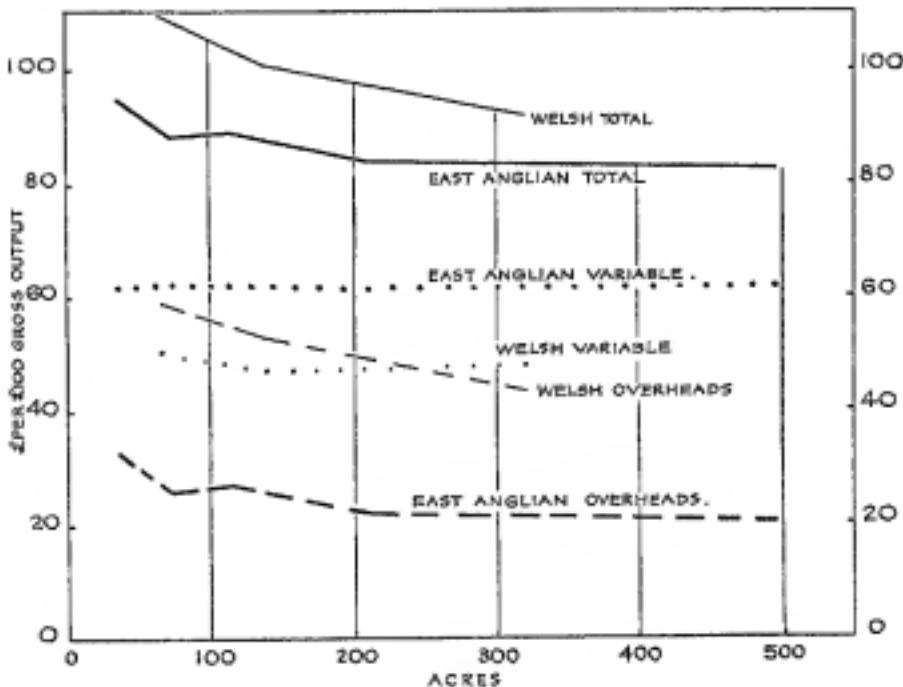
FIG. 11. *Overhead variable and total cost per unit output by size groups*
(East Anglian and Welsh sample)

(in the economic sense) of the basic resources of the farm, i.e. the land, the main items of machinery and equipment and especially his own labour, because the volume of his business is too small. The importance of the level of gross output as a measure of scale of enterprise can be seen in Table C-VII of Appendix C, in which overhead and variable costs are grouped by gross output rather than by size of farm. While total costs per unit output decline steadily as gross output increases, the overhead costs decline much more rapidly, and the variable costs per unit output rise evenly throughout.

Criteria of viability

The association of total resources required to produce a unit of output with size of farm and volume of output suggests a method of determining viability. Table C-VII of Appendix C shows that for the Welsh sample a gross output of about £2500 is associated with a total cost of £100 required to produce £100 worth of gross output, i.e. this level of gross output results in the farm "breaking

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even" as an economic unit. For this sample there is a slight variation with type of farm and quality of land, but the agreement is good enough to suggest that the subject might be examined further in order to test whether gross output rather than acreage is the primary factor determining the level of economic efficiency at which a farm can operate. It would also be useful to ascertain whether the "break-even point" is associated with the same or different levels of gross output in other areas and for different types of farming.

Unfortunately, it has not proved possible to provide comparable information for the East Anglian sample. Table D-IV of Appendix D shows that the total *net* output required to produce an income of £500 rises with size of farm, but the required net output per acre falls with increasing size due to the better spreading of fixed costs.

These criteria of viability, while probably satisfactory as guides to present or past performance, do not of themselves permit estimates of the potential profitability of a particular farm to be made. For this purpose it would be necessary to isolate those factors due to unchangeable characteristics of the farms themselves. The level of gross output is a reasonably satisfactory measure of scale of enterprise and, if the indications outlined in the preceding paragraphs are substantiated by further analysis of a wider sample, it might be possible to develop an index of potential viability on a basis of overhead costs. In theory a non-viable farm could be made viable by increasing the scale of enterprise to a point at which the fixed costs as a proportion of gross output were sufficiently low to permit an adequate margin of output over inputs. Such an increase might require a change in farming methods and additional capital, and the practical problem therefore requires finance and improved management and technical ability. In practice, there are obvious limits to increasing the level of the enterprise, partly because all methods involve improving management and partly because the methods used by the small farmer to increase the scale of his enterprise have usually meant types of farming in which the proportion of variable costs to total costs is high. The problem of increasing the viability of the small farm is therefore one of increasing scale of the enterprise without allowing the proportion of variable costs to rise too steeply.

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MATERIAL FACTORS

In Part III of this report it was shown that many factors, such as type of farming, intensity of operation, quality of land and the different make-up of output as between small and large farms, complicate any attempt to measure the efficiency of agricultural production.

In the remainder of this report we examine some of the factors which may contribute to the differences in the economic efficiency of farms of different size. In the present section we deal with what seems to us to be the most important of those factors; those are largely, but by no means entirely, independent of the farmer himself, viz.:

    (a) Labour utilization
    (b) Capital
    (c) Mechanization
    (d) The system of land tenure
    (e) The influence of subsidies

Other considerations, such as nearness to markets and other commercial factors, may, of course, exert an influence on the relative economics of small and large farms, but their effect is probably not so important in the short and medium term.

The large farm in common with most other large businesses enjoys advantages in buying, selling and financing. The prices of many of the things bought by a farmer depend on the size of the lot in which they are bought; for instance, fertilizer and feedingstuffs prices are usually £1 a ton cheaper for six ton lots than for one ton lots, and diesel oil is 1d. a gallon cheaper if bought in lots of over 500 gallons. Similarly, the large farmer can often sell on more advantageous terms, for he can offer full loads to the merchants, and thus save both transport and clerical costs and he can take advantage more easily of special opportunities for higher prices; for example, the "level delivery" bonuses for eggs payable of bacon pigs. The larger farmer is also generally regarded as being more credit worthy and can therefore more easily raise extra capital. These advantages are, however, difficult to measure and they are unlikely to be as significant in their effect as those discussed below.

LABOUR UTILIZATION AND SIZE

One of the most important factors determining the efficiency of the individual farm is the use which is made of the labour force. This is brought out clearly by the analysis in Part III of the use of resources on different groups of farms; this shows how widely the amount of labour employed in the production of £100 of output varies with the size and type of farm. These variations in the efficiency of labour use arise from the intervention of three sources:

    (a) the total labour force appropriate to the size (in terms of both acreage and level of output) of the farm;
    (b) the social and family factors affecting the amount of labour available on the farm;
    (c) the management policies of the farmer.

It is not possible to separate out the effect of each of these sources but they have served as a framework for our discussions on this topic.

The numbers employed in agriculture in this country have been declining for the past century, although this decline has been punctuated by reversals in the general trend brought about by wars and periods of economic distress—such a reversal took place during the 1940's—but in the past decade it has been resumed. This fall, however, appears to be almost entirely farm employees, for the number of farmers (who provide a very important part of the total labour force) seems to have remained relatively constant. From 1949 to 1957 the total number of employees fell from 848 000 to 696 000, and is likely to fall still further. Unfortunately, there is no information available for recent years of the distribution of the employed labour force or of the incidence of the decline in numbers according to the size of farm. No doubt it is the larger farms, with their large machines, which have been able to dispense with labour most easily.

One of the outstanding features of farming compared with other industries, is the contribution of the farmer and his family to the total labour force. Nearly half the holdings in England and Wales do not employ regular workers, and over two-thirds employ only one regular man or none at all. At the other end of the scale, under 10 per cent of the total number of holdings employ over four regular workers, but these account for 45 per cent of the total number of regular workers. (Table VIII.)

TABLE VIII[1]

Distribution of regular workers on holdings in England and Wales

Regular workers per holding	Per cent of holdings	Total regular workers ('000's)
None	44	—
1	22	65
2	14	82
3	7·3	64
4	4·1	48
5–6	3·8	59
7–9	2·2	49
10–19	1·7	64
20 and over	0·6	60

The general pattern of labour supply on the farms of this country consists of a minimum provided by the farmer and members of his family supplemented as necessary by hired labour, casual and part-time workers. There is thus a minimum supply of labour available on every full-time farm—the family labour force—the size of which is so determined by the farm production programme but by social factors. These social factors governing the amount of labour employed on many farms, create special problems for the organization of its efficient use, since the potential output of the farm is determined primarily by the extent and quality of the land itself rather than by the labour available.

The amount of family labour retained on the farm, particularly the children of the farmer, depends upon many factors outside the farm itself—the availability of well-paid employment off the farm, the educational background of the people

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concerned—and it also depends upon the social conventions of the local community, which vary a good deal from one district to another. It is difficult to generalize about these factors but their importance, although still considerable, is probably declining as communications improve and industry and transport spread.

The average number of workers per man is very much smaller than the average number per business in manufacturing industry. Nevertheless, there are important economies in labour use which are associated with the size of the farm, or with the individual enterprises which together compose it. This is exemplified by the figures for dairying given in Table IX. They show, for example, that the amount of labour used to produce a gallon of milk is almost twice as much in herds of under ten cows as in those of over fifty cows. As the size of the herd increases there is, at first, a marked improvement in labour utilization but, in the group of largest-sized herds, the trend reverses.

TABLE IX [2]

Labour requirements by size of herd, for an identical sample of 366 herds, 1955/57

Size of herd	0-9	10-19	20-29	30-39	40-49	50-59	60 and over	All herds
Number of herds ..	57	111	78	41	35	14	26	366
Average size of herd ..	7·3	15	24	34	44	54	72	26
Average yield per cow (gallons) ..	770	780	820	790	820	800	850	810
Labour hours per cow ..	190	140	130	110	110	100	110	120
Percentage unpaid labour ..	90	66	43	28	18	15	9	37

These economies of scale in labour use are, of course, characteristic of all forms of economic activity. Indeed, they appear to be of considerably less importance in agriculture than in other industries. They certainly exist, however, within agriculture too, particularly as the size of the business increases from a very small level. Among the principal causes we might mention the following:

(a) There are a number of tasks in farming which are of an essentially 'overhead' nature, and which do not increase proportionately as production increases. For instance, it takes the same time to wash two milking machine units after milking twenty cows as it does after milking ten cows.

(b) The increase in the size of the farm makes it economic to use more and larger machines, which raise the total output without increasing the total amount of labour used. The use of a combine harvester in the Eastern counties reduces the labour required for harvesting cereals to just over five labour hours, compared with twenty-six to twenty-eight for binder harvesting.

(c) A farm with a number of men employed on it gives opportunities for individuals to specialize, thus making better use of innate skills and aptitudes, and providing better opportunities for developing particular skills.

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(d) Some tasks on a farm can be organized more efficiently on a team basis; these methods can be partially realized by small farmers co-operating on such tasks as harvesting and threshing, but there are plenty of smaller jobs which an extra pair of hands makes considerably easier.

Against these advantages must be set the increasing difficulties of supervision as the size of the labour force increases, and the problem of incentives to extra effort with a force of predominantly hired workers. This means that there are good reasons for expecting the efficiency of labour use to increase as farm size increases on the smaller farms, but to dwindle again when the farm size expands beyond a certain point. This point occurs relatively early in agricultural businesses, but it is difficult to fix it with any accuracy because of the comparative rarity of large farms in the samples.

The most useful measure of the efficiency of labour is the relationship between the standard man-days required on a farm and the actual man-days available. The 'standard man-days' required are determined by attributing to each acre of crops and each head of livestock a standard labour requirement, and adding to the sum of these an allowance for overhead work, e.g. ditching, hedging, marketing. In this way a picture of the labour requirements for a farm worked with standard efficiency can be built up; and this can be compared with the labour supply actually used on the farm. (Part-time casual and family labour, and the labour of other women and juveniles, are converted to 'equivalent' man-days according to the ratio of their cost to that of a day's labour by a regular hired man.)

The results of such an analysis of labour efficiency are set out in Table X for samples of farms in an arable and in a livestock farming area (East Anglia and Wales). The standard man-days have been derived from "enterprise" cost studies in the area and thought to work achieved by labour in combination with other factors of production and are influenced by the type and amount of these other factors. They are not, of course, the same in the two samples, which cannot, therefore, be directly compared.

The results show that variation in efficiency in labour use varies with type of farming as well as with size. In general small farms are less efficient than large ones in their use of labour only if they are not farmed intensively. The most intensive small farms in the East Anglian Dairy, Pig and Poultry group, and the Welsh Better Land Dairy group reach a level of labour efficiency which is as good as any found on larger farms of the same type. There are in fact bigger variations between the various types of farm in the under 100 acre size group than there are between the various sizes of any one type. Among the groups of farms under 100 acres the differences are very marked indeed, and they are closely associated with the average level of output achieved on the farms.

The level of output mainly determines the efficiency of labour use. Where small farms are unable to reach a high output, a low level of labour efficiency is almost inevitable. For instance, the results from these samples show that there are two important sources of variation in the way in which labour is used. Farms tend to become more efficient as they increase in acreage and in intensity within any size group. Indeed, there is a large variation in efficiency within any size group, the better land farms using their available labour appreciably more efficiently than the poor land farms, the differences being most marked in the smaller size groups. All this merely confirms our expectation that labour

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TABLE X

Efficiency of labour use in agriculture

(Average efficiency=100)

A. Welsh sample[3]

Type of farming	Size of farm (acres)			
	0–49	50–99	100–199	200 and over
Dairy (better land)	110	130	130	130
(poorer land)	74	96	130	130
Mixed (better land)		100	120	110
(poorer land)		82	88	120
Livestock rearing (better land) ..		66	83	97
(poorer land) ..		59	66	93(a)
				98(b)
All farms		92	99	104

(a) Farms with over 80 per cent of their total acreage rough grazing.
(b) Farms with less than 80 per cent of their total acreage rough grazing.

B. East Anglian sample[4]

Type of farming	Size of farm (acres)			
	0–49	50–99	100–299	300 and over
Alluvial	90	94		93
Cereals		72	81	86
Mixed crops		77	93	87
Arable crops		91		110
Arable, pigs and poultry		84		88
Dairy, pigs and poultry		88		98
Mixed livestock		91		95

efficiency increases with increasing size of farms only up to a point and that that
point fails as intensity of farming increases.

The main reason for the unsatisfactory results of the livestock rearing farms,
particularly those on poor land, lies in their low rates of stocking and of produc-
tion. In the group of poor land livestock rearing farms under 100 acres, the total
theoretical labour requirements for over half the farms in the sample were below
300 man-days a year. These farms should not really provide a full-time occupa-
tion even for the farmer himself, let alone for any other labour which may be
associated with them. However, owing to their inherently poorer physical
features, and the frequently inadequate state of their permanent equipment, the
farmer may have little time to spare if he is to complete all his tasks, and in that
sense they are full-time farms. Nevertheless the actual amount of output per
unit of labour on them is so small that obviously the labour is very inefficiently
used indeed. In other words, a farm has to be of a certain minimum size, in
terms of its cropping and stocking, if it is to make proper use of the labour
available. Farms below this size cannot help being inefficient in labour use,
unless they are run only as part-time holdings. Although this does not mean
that efficiency cannot be achieved on farms of small acreages, it is clear that
there are a very large number of holdings in this country where the present
labour force is not being effectively used.

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In Part III we showed that small farms operate at a generally higher level of intensity than larger farms and we should therefore expect that the capital invested per acre on small farms would be higher than on large. In this section, therefore, we first attempt to relate the level of capital investment to size of farm, before discussing the effect of capital on efficiency.

Capital investment in agriculture can conveniently be divided into three categories:

(a) *Indirect investment*. This includes national investment in power, transport and in general services (research, the National Agricultural Advisory Service, marketing organizations and the like). Although these are clearly of great importance to the general prosperity of the nation's agriculture, it is impossible to apportion their effect between farms by size or type. This category, therefore, will not be discussed further.

(b) *Landlords' capital*. This may loosely be described as the investment in the land and farm buildings, etc.

(c) *Tenants' capital*. This is the investment in livestock, crops, machinery and so on, together with the money required for the day to day operations of the farm.

Landlords' capital is largely composed of fixed capital with the small proportion of the operating capital which is required for upkeep, whilst tenants' capital is composed of both fixed capital (e.g., major items of equipment) and circulating capital.

Landlords' capital

The available information is recorded in Appendix F. The data is based on prices obtained in sales of farms by auction in England and Wales. The figures are averages and no attempt is made to distinguish between types of land, location etc., which obviously have a major effect in determining the sale price. Viewed as an investment, the basis of the price a buyer is willing to pay must be the output or potential output of the land, rather than the actual number of acres offered, and this obviously varies widely.

The trend of prices between the wars showed that whilst the larger farms on the whole tended to fall in value per acre, the smaller maintained their value or increased it to some extent. The price per acre of small farms was consistently higher than that of large farms throughout the period, and this divergence of value increased from 1918 to 1939, mainly as a result of the fall in value of larger farms. By 1939, the average price per acre of a small farm (5–50 acres) was over three times that for a farm of over 300 acres.

From 1939 to the present day other factors have begun to operate. War-time conditions stimulated the industry generally, but due to a combination of legal factors, custom and so on, farm rents did not rise proportionately to the value of farm output. Table XI (derived from Table F-II of Appendix F) shows how the values of farms sold without vacant possession have varied for certain selected years between 1939 and 1957, both in terms of price per acre and relative to the average 1937/39 price for each size group expressed as 100.

Peak values were reached in the early 1950's and subsequently prices have fallen. On the whole, values per acre have increased rather more for large farms than for small farms, but small farms are still commanding rather higher

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TABLE XI
Farm prices 1939/57 by acreage (England and Wales) without possession[(2), (4)]

	5–50		50–100		100–150		150–300		300+	
Year	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.
Averages:										
1937/39 ..	100	34	100	29	100	19	100	18	100	18
1947 ..	216	73	166	48	157	30	157	28	119	22
1950 ..	209	68	152	44	167	32	213	38	106	19
1955 ..	189	64	190	55	228	44	238	43	327	60
1956 ..	237	81	175	51	189	37	229	41	232	42
1957 ..	149	51	148	43	198	38	201	36	192	35

prices per acre than large farms. As the sample is unlikely to be representative, and cannot be corrected for differences in value between poor land and good land farms, it would be unwise to draw any further conclusions from Table XI about the relative value for investment of small and large farms sold without vacant possession. In any case prices without vacant possession are a measure of the rental value of farms and are affected by a number of quite arbitrary factors.

It is of much greater importance to consider the changes in prices of farms sold with vacant possession, since in this case what is being sold is the potential output of the farm rather than its value as a rent-producing property. Table XII below (derived from Table F II of Appendix F), shows the changes in vacant possession prices for selected years between 1937 and 1957.

TABLE XII
Farm prices 1939/57 by acreage (England and Wales) with vacant possession[(2), (4)]

	5–50		50–100		100–150		150–300		300+	
Year	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.	Index %	Price p.a.
Averages:										
1937/39 ..	100	49	100	35	100	29	100	22	100	13
1947 ..	300	150	250	87	250	73	250	56	340	44
1950 ..	360	170	280	86	260	75	290	64	420	54
1955 ..	330	160	250	85	270	77	310	68	450	58
1956 ..	270	130	270	93	260	75	310	68	460	60
1957 ..	280	140	240	83	260	74	310	67	390	50

The increase in price per acre is greater for the large farm than for the small; in 1937/39, the price of small farms per acre was about four times that for the largest farms, whereas in 1957 the differences were reduced to between 2·5 and 3. (Part of the reason for this may be that in the mid 1930's the value of large

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farms was abnormally depressed compared with small farms and in subsequent years this distortion began to be corrected.) Prices of small farms sold with vacant possession are now nearly three times the 1937/39 average, while those of the larger farms are nearly four times the 1937/39 average. The divergence between prices with and without possession since 1939 is marked, but there is no great difference in this divergence between small and large farms.

We can infer that over the years there has been a general desire to own a small farm—prices per acre of small farms with vacant possession are consistently higher than for large farms—but that in the post-war years this desire has not increased relative to that to own a large farm. Prices have risen by about 270 per cent of their 1937/39 values taking the consumer price index as standard. Farms in the larger groups appear, therefore, to be commanding prices in excess of their pre-war position relative to prices of other commodities, unlike small farms which have just maintained it. Investment values (i.e. prices without vacant possession) have fallen consider-*bly vis-à-vis* other prices.

It is often suggested that, in recent years part-time and hobby farmers and those whose main purpose is to provide themselves with accommodation rather than to farm for profit, have substantially increased the demand to own small farms. If this were so, the prices of small farms with vacant possession should have shown a faster rate of increase than larger farms. This does not appear to be the case.

Tenants' capital

In spite of the volume of agricultural data collected each year, there are difficulties in arriving at an accurate estimate of tenants' capital, either on the average or as it varies with size and type of farm. In the following paragraphs four sources of data referred to are:

    (a) The Farm Management Survey national data on opening and closing valuations. This provides an indication of that part of the tenants' capital which is invested in stock, crops etc., but does not include the actual cash which the farmer requires to operate his business. However, the average of the opening and closing valuations gives a rough and ready indication of the relative amounts of tenants' capital, though it cannot be used to indicate its absolute magnitude.

    (b) An estimate of total tenants' capital in the United Kingdom from 1937 to 1952, based on valuations of livestock, crops, machinery and miscellaneous items, by Cheveley and Price[1], extended to cover 1957 values[1].

    (c) An estimate of tenants' capital in Wales and East Anglia based on the F.M.S. sample of farms in these regions. They differ slightly in methods of estimation. Details are given in Appendix F.

    (d) A sample of 414 farm accounts collected by one of the major banks, including the Bank's estimate of the capital involved.

Tenants' capital per acre

Table XIII below compares the estimate of tenants' capital made from the sources described above.

These estimates diverge considerably, partly because of the great difficulty of taking into account the proportion of the farmer's operating capital which does not appear in stocks; these vary widely in different enterprises and at different times of the year. For example, the rate of turnover of capital with arable and

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TABLE XIII

Average tenant's capital per acre

Source	Capital per acre £	Remarks
F.M.S. National data available 1951/2–1955/6	27	An underestimate—does not include operating capital* or valuation of stocks of feeding stuffs, fertilizers and cultivations.
Cheveley and Price 1956/7	60	Figure includes operating capital* and is for the United Kingdom as a whole.
East Anglia sample 1956	50	Includes most if not all of operating capital*.
Welsh sample 1956/7	26	Slight underestimate as a proportion of operating capital* not included.
Bank sample 1957	69	Sample may include a few highly capitalised specialists; figures include an estimate of operating capital*.

*i.e., cash which the farmer required to operate his business.

livestock enterprises is on the whole long, while in dairy, pig and poultry enterprises, the returns and outgoings are more frequent and are fairly well spread out over the year. Nearly all farms combine several different kinds of enterprise and hence estimates of the actual amount of circulating capital are extremely difficult to make. Further, in certain cases, the average figures quoted are misleading as they conceal the effect of important factors which determine the amounts of tenants' capital.

Variation of tenants' capital with type of farm

The wide variation of tenants' capital with type of farm is shown by Tables F III and F IV, Appendix F. In Wales, the more intensive types of farming (dairying and mixed farms) use about twice as much capital per acre as the livestock rearing group. For farms on better land, the figures are £38 per acre for dairying, £37 for mixed farms and £29 for livestock enterprises. The East Anglian sample represents an entirely different type of farming; all are basically arable farms. While the average without respect to type or size is £50 per acre, the two basic farming types represented (upland arable and the highly intensive fenland farms) show considerable differences in capitalization, the former averaging £44 per acre, the latter £75 per acre. Even within the sub-types of the upland arable classification, there are wide divergences from the mean of the group, as can be seen in detail in Table F IV.

Variation of tenants' capital with quality of land

Table F III of Appendix F shows the wide variation of capitalization between the types of land in Wales. In most cases the better land farms use almost twice the capital on average than the poor land farms do. For East Anglia, where the quality of the land is much higher, there is no comparable trend except in so far as land quality is reflected in the type of farming. For example, the fenland group is characterized by extremely rich and fertile soil permitting a much more intensive type of arable farming than the upland farms, and this is reflected in the amount of capital used per acre.

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Variation of tenants' capital with size of farm

The information in Appendix F may be summarized as follows:

(a) The Welsh sample shows a definite trend, the small farms using about one and a half times the capital per acre used by the larger farms.
(b) The East Anglia sample shows no particular trend, except in the case of the fenland farms where there is a slight tendency towards higher capitalization on the smaller farms.
(c) The F.M.S. national data show a general tendency for the smaller farms to be more highly capitalized than the larger. As would be expected from the contrast between (a) and (b) above the trend is much more marked for livestock than for arable farms.
(d) The Bank sample shows a consistent trend towards higher capital requirements on small farms. There is not much difference at the higher acreages between the capital used by the different types of farms, though the larger livestock farms require only a little more than half the capital per acre used by the other types: a livestock farm which is comparatively large in extent is still a small business using less capital than a smaller more intensive arable or mixed farm.

Changes in capitalization

Appendix F provides information [1] which shows the changes in the amount of tenants' capital in the United Kingdom between 1937/38 and 1952/53; the valuations are based on 1937/38 prices. Total tenants' capital on this basis has risen by 46 per cent, or 3 per cent per annum, which corresponds very closely to the rise in the value of agricultural net output over the same period. The relative proportion of the items going to make up tenants' capital has, moreover, undergone considerable changes. The proportion invested in livestock has been considerably reduced, while that invested in machinery has been greatly increased. The investment in machinery items was 168 per cent higher in 1952/53 than in 1937/38. Thus a greater proportion of tenants' assets are now held in machinery, which depreciates and may not have a high second-hand value, rather than in livestock and crops.

NEED FOR CAPITAL

It has long been recognized that there is a real danger in undercapitalization in farming. We can do no better than quote some remarks by Professor M. G. Kendall written in 1941, but probably equally true today [1]. "The tenacity of the farmer in hanging on to his farm at all costs is thus apt to result in a chronic local condition of undercapitalization in agriculture. The effect is enhanced by the optimism of new entrants, who frequently take over a holding with insufficient capital, in the hope of being able to make enough profits to pay back into the business to restore the farm to proper condition. Even in prosperous times there will be a marginal fringe of farmers, and therefore of farms, in such circumstances; and when there is a series of depressions on the structure of agriculture is undergoing secular changes the numbers may be considerable. When this kind of thing happens in industry, the impoverished units usually drop out and their remaining business is absorbed by other enterprises; but impoverished pieces of land are not readily absorbed, and thus local agricultural impoverishment, sometimes acute, is always chronic."

As we have seen, the *actual* level of capital used depends on farm size and this result surely to some extent reflects the need for capital. In theory it might be

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possible to calculate the optimum amount of national agricultural capital required to achieve a certain level of output most economically, but the calculation would have to assume an ideal distribution of land between farms. The question may reasonably be simplified, however, by regarding the present pattern of farm size as fixed for practical purposes.

Evidence leading to show that the scale of enterprise on small farms is on the whole too low for maximum economic efficiency has been discussed in Part III of the report. Raising the scale of enterprise to produce a better ratio of output to fixed costs must involve an increase in farm expenditure (though a disproportionate increase in variable costs should obviously be avoided). For example, in a sample of forty-seven grassland dairy farms [18] the level of output, expenditure and income were closely related; to obtain a £10 increase in gross output extra expenditure of £7·1 per acre was required, which produced an increment of £2·9 per acre in income. For this type of farming the amount of working capital required is about one-sixth of the level of expenditure. It may therefore be assumed that a £10 increase in gross output requires an extra £1·2 per acre of working capital.

An increase in output also affects fixed capital. For example, in livestock enterprises, greater intensity usually requires heavier stocking. As the extra output must be achieved with the minimum increase of fixed costs (particularly labour costs) an increase in intensity may also require an increase in capital invested in buildings, etc.

If, therefore, the present pattern of farm size is to be maintained, more capital will be required if small farms are to achieve higher net incomes. This does not mean, however, that the provision of more capital will necessarily solve the problem. The small farmer with a holding which (other things being equal) is economically below average must have the technical ability and knowledge as well as the business acumen to overcome the problems involved in increasing his scale of business. Again, the quality of the land has an important effect on the requirement for capital, and it is not known to what extent extra capital can offset the adverse effect of poor land on output. The relation of any effect of this kind, if it exists, to the level of technical skill required of the farmer is also unknown.

In short, working capital per acre depends almost entirely on intensity. Where land quality and type of farming permit more intensive farming systems to be used irrespective of acreage, there is little variation in tenants' capital per acre with size of farm (the East Anglian "Upland" farms are an example). The capital used per acre is, however, higher on the small farm at both extremes of land quality. For example, the ultra-intensive small fen-land farm uses relatively more capital than its larger neighbour. Again, the small poor-land farm concentrating on milk, pigs and poultry is more heavily capitalized per acre than the larger poor land sheep rearing holdings. These results suggest that, if the net income of small farms is to be raised by increasing intensity, more tenants' capital (both operating and fixed capital for stock etc.) and probably more landlords' capital will be required; to that extent some small farms are at present undercapitalized. We do not know, however, on what percentage of such farms the potential level of management is sufficiently high to take advantage of the increased capital theoretically required.

MECHANIZATION

There is no doubt that, in the last ten years, the net increase in output in agriculture which has occurred, while the total agricultural population has been

declining, has been brought about at least partly by the great increase in the use of power on the farm.

The total power available (measured in terms of horsepower) is almost eight times that before the first world war; in 1954 it was about four times than available in 1939[7]. By far the larger part of this increase is accounted for by tractors (which are, however, often used as stationary power sources). The increase in mechanization generally is illustrated by the increase in the tractor population[11].

TABLE XIV
Numbers of tractors—England and Wales

1946	1950	1956	1957
179 850	295 270	426 500	424 980

The same trend is apparent for cultivators, combines and almost every type of farm machinery.

There has also been a great increase in ancillary power and machinery. Stationary power, other than electric motors, has been declining in recent years, but ancillary electrically powered machines are steadily increasing in numbers, reflecting the increased use of labour-saving machinery in the barn and farmyard.

Number of tractors in relation to farm size

Little information on the relation of amount of machinery as a whole to farm area exists, but tractor numbers per acre should give a reasonable indication of the relative position of small and large farms, provided care is taken to compare farms of similar types—obviously tractor numbers vary considerably with type of farm.

Information on this subject from two sources is detailed in Appendix G, the first referring to a study carried out by the National Institute of Agricultural Engineering (N.I.A.E.) on tractor usage and acreage from the census returns of 1,593 farms in selected areas of England and Wales[11], and the second the Farm Management Survey sample for 1955/56 for East Anglia[13]. In the N.I.A.E. study farms are grouped by numbers of tractors held, and the acreage per tractor for single tractor farms, two tractor farms and so on, is shown. The acreage per tractor is calculated both generally and for its amount of tillage acreage only. In terms of total acreage the figures show that one tractor farms (as indicated by the total number of tractors kept) each tractor is responsible for more acres than on smaller farms. As would be expected this trend is more pronounced if the tillage acreage only is taken as the basis of comparison. Here (for the sample generally) tractors on six or seven-tractor farms each cover about double the acreage per tractor obtained on small, single tractor farms. The East Anglia data also show the same trend and here the number of tractors per 100 acres falls off from four for the small under-fifty-acre farm to just over one for farms above 300 acres in extent. As would be expected, both samples show considerable variation between areas and soil types.

A partial explanation of these figures might, of course, be that tractors are more intensively used on small farms than on large. However, the greater intensity of small farm operations in the arable group means a change in the balance of type of farming. While a large arable farm derives a large part of its output from cereal and other crops, the small arable farm tends to devote a

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larger part of its resources to production from livestock (pigs, poultry and dairying), which are activities requiring fewer tractor-hours than straight-forward arable cultivation. This suggests, therefore, that the fewer tractors required per acre on the larger farms are a true economy to scale in numbers of tractors. Details on the relative usage of tractors for the different operations are given in Appendix G, Table G IV[14].

This is confirmed by analyses of man work units, and tractor work units required on predominantly milk-selling farms in S.E. England[14]. Greater inputs of man or tractor hours are required as the scale of production increases per unit area. The increase is less marked in respect of tractor requirements and there is a proportionate decline in the amount of labour devoted to crop production. Intensification, as in East Anglia, is therefore, mainly a concentration on livestock production.

Tractor requirements

The numbers of tractors required for arable farms can be calculated by taking a standard pattern of cultivation and calculating the total tractor hours (see Appendix G). These predicted requirements have been studied in relation to a detailed survey of actual use of tractors on a sample of East Anglian farms[14]. (On the small and medium farms studied the actual numbers of tractors were slightly in excess of the predicted numbers.) The numbers of tractors required could therefore be related to the number of tractor hours: results are quoted in Appendix G, Table G V. One tractor is required if the amount of work is below about 800 tractor hours, two if it is between 800 and 2000 tractor hours, three up to 3200 tractor hours and so on. In other words, the first tractor can cope with tasks up to 800 hours and the second and subsequent machines 1200 hours. Further evidence from large farms* in East Anglia[14] indicates that these theoretical requirements are overgenerous on very large farms with a close-knit arable system and the actual numbers used are considerably less. (Table G VI, Appendix G.) At the lower end of the scale (50–200 acres) the available information indicates that the actual numbers of tractors is in excess of the theoretical requirement. This is probably due to the existence of older machines in a stand-by role on small and medium farms which are very probably not fully utilized but which are required as a measure of insurance. The larger farmer, on the other hand, tends to replace his machines on a rota system modified from time to time, no doubt, by the fluctuation of profits and changes in taxation.

TOTAL COST OF MECHANIZATION

Capital required

The cost of tractors is not the only capital cost of mechanization; other implements may well cost some hundreds of pounds even on a small farm. Most of these are used seasonally, again resulting in unavoidable under-utilization. On small farms, the variety of work is much the same as on larger farms and hence the capital cost of implements per acre is higher on smaller farms. For example, a small farm of fifty acres needs to invest £6–£9 per acre on implements to achieve a moderate degree of mechanization, whereas the same degree of mechanization on a 800 acre farm would probably cost between £1 and £2 per acre.

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*Large farms tend to have a larger proportion of heavy tractors and crawlers.

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The total capital cost per acre of mechanization is thus reduced as size of farm increases because fewer tractors per acre are required and the implement cost per acre falls. The results of a study of this are summarized in Appendix G, Fig. G-1[14]. Above 600 acres the cost per acre is relatively stable, and the differences in cost per acre of the most advanced scale of mechanization compared with the simplest is only £6–£8 per acre for farms of 1000 acres. For large farms the total cost of advanced mechanization is about £17 per acre. At the lower end of the scale, even simple mechanization costs about £20 per acre and the more advanced forms are quite out of the question financially. The degree of mechanization, using new equipment, is therefore limited in practice by the size of the farm. Below 200 acres a simple system costing between £20–£40 per acre is all that can reasonably be afforded; between 200–500 acres £20 per acre is sufficient to obtain an intermediate degree of mechanization, while above 500 acres this expenditure provides an advanced level of mechanization.

It should be emphasized that these costs are for new equipment, and relate to mixed farming in an arable area—the type of farming in which a high cash value of output is associated with the maximum profitability per acre. Hence these costs should not be considered as representative of all types of farming in the United Kingdom: they are clearly a maximum.

We conclude that the small farmer is handicapped in the capital cost of mechanization compared with his neighbour on a large farm. He must either accept a lower standard of mechanization with possibly a loss of output (which under present conditions he cannot afford) or find some other way of providing the machinery he requires at a lower capital cost, for example, by obtaining second-hand equipment at reduced cost, by employing contractors or by a mixture of both. He may also purchase smaller and cheaper equipment; some of these machines may be less efficient than larger units. There are also examples of sharing machines on a co-operative basis, but this practice does not seem to be as widespread as the logic of the situation would suggest. There are admittedly difficulties in allocating the use of machines at busy periods, but the fact that the better-planned schemes run successfully indicates that the difficulties are not insuperable. Taking the situation generally, however, smallness in size is bound to carry some penalty in mechanization.

Operating costs

The operating costs of farm machinery may be considered as having a fixed and a variable component. The fixed costs include depreciation, interest on the capital used, and miscellaneous items (e.g. housing and insurance), while the variable costs comprise fuel and repairs. As a refinement for certain machines (particularly tractors) depreciation should be considered as having two components, a fixed element which includes a factor for obsolescence, and a variable element depending on the amount the equipment is used[17].

Little information is available about true operating costs. Depreciation is often calculated on the "written-down value" by which the value of a machine declines by a fixed percentage of its diminishing value each year. While this is useful for tax purposes, it may bear little relation to the money which must theoretically be set aside each year against the replacement of a machine when it is worn out or obsolescent, particularly for machines having a long life. Apart from difficulties of this kind, a comparison of operating costs per acre for small and large farms is unlikely to provide any further indication of the relative

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economic effects of mechanization beyond that already discussed in the comparison of capital costs above.

By relating operating costs to output, however, it is possible to discount the effect of one important factor, namely variation in the nature of output with size of farm, which is masked by considering costs on a per acre basis. We are then comparing the estimated machinery costs of producing a unit of output on small and large farms, and the comparison will show the combined effect of different scales of mechanization, different ages of machines (reflected in different depreciation) and different rates of usage, although how much more complete information the separate effect of each of these factors cannot be shown.

This comparison can be made from the information given in Appendices C and D for the Welsh and East Anglian Farm Management Survey samples. The data include charges for depreciation, repairs, fuel and (where applicable) contract services. They do not include an allowance for interest on the capital value of the machinery, which is included in the interest charge on the whole of the tenants capital. These figures probably provide a satisfactory measure of the contribution of machinery costs to output by size of farm.

Table XV below summarizes the available information from Appendices C and D:

TABLE XV

Operating costs of machinery per unit of output
East Anglian sample (average 1954/55 and 1955/56)

Item			Size Group (£ per £100 gross output)				
			20–50	50–100	100–150	150–300	300+
Depreciation	..	..	4·2	4·8	6·0	5·8	5·2
Repairs	..	..	2·4	2·8	3·7	3·6	4·7
Fuel	..	..	4·4	4·6	5·0	4·2	4·6
Contract	..	..	4·0	3·3	3·3	2·5	2·1
Total machinery costs	..	..	15·0	15·5	18·0	16·1	16·6

Welsh sample (1956/57)

Item		Size Group (£ per £100 production)				
		Dairy farms only		All farms		
		1–49	50–99	0–99	100–199	200+
Total power and contract		14·6	17·0	17·1	17·4	16·8

The total of machinery costs per unit of output for both samples is remarkably constant: it would seem that by one means or another the smaller farmer has managed to keep his operating costs in step with those of the larger farms. For the East Anglian sample, depreciation, repairs and fuel costs all increase slightly with size of farm, while contract costs are reduced. Total costs remain constant because of:

(a) greater emphasis on small farms on types of husbandry which do not require a high degree of mechanization (e.g. livestock products rather than cereal growing);

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(b) less heavy use of basic machinery (associated with selection of the appropriate types of husbandry as in (a) above) resulting in lower repair and fuel costs on small farms;

(c) purchase of second-hand machinery, resulting in lower depreciation;

(d) greater use of contract services on small farms* which tends to lower the total requirement for owned machinery.

Optimum level of mechanization

The basic resources of a small farm are the land and the labour of the farmer and his family. The land itself to a considerable extent dictates the pattern of farming, and the management problem for the small farmer is to select that combination of enterprises which gives the maximum net income from these resources. (The paid labour of an assistant is a fixed cost and probably also should be regarded in the same way as 'his own and family labour'.) The optimum level of mechanization depends on the degree to which the productivity of these resources can be increased by increasing the capital investment in machinery.

A net increase in labour productivity can be obtained either by substitution of machinery for labour at the same level of output, or by increasing output for the same labour cost, or by a mixture of both. A study of labour and machinery costs on an output basis for forty predominantly milk-selling farms in south-east England (Table G VII in Appendix G)[11] shows that the combined cost of labour and machinery decreases per unit of output as output increases. This may be an additional reason for the increase in efficiency in use of resources noted in Part III: as volume of output increases it becomes easier to strike the right balance between machinery and labour so that less of these fundamental resources are required per unit of output. In the same study, a more detailed analysis of the composition of both labour and machinery shows that both operating and capital costs of machinery are higher per unit of output on farms with lower output. How much this is due to a lower standard of operational efficiency on farms with a low output and how much is inherent in the "smallness" of the enterprise cannot be determined. A number of factors concerned with the organization of the small farm, rather than the way it is operated are clearly involved: minimal levels of mechanization, the greater difficulty of substitution of labour by machinery on the small farm, and non-economic considerations all play a part. In short, while it is not possible to find the optimum level of mechanization from the available information, all the indications are that on the small farm the optimum is inherently more difficult to attain. Inevitably, the penalty of smallness in size is a lower level of mechanization, but equally smallness makes it much more difficult to arrive at a correct balance of resources themselves. Much more information is required, however, before the problems can be satisfactorily elucidated, particularly on the economic aspects of substitution and on the marginal increase of output with mechanization. For example, we know very little about the number of men and machine hours actually expended on farms of different types to produce a given amount of output.

Type of mechanization in relation to farm size

In the published information on mechanization, there is little reference to the possibility that small farms may require a type of mechanization different from that

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* Contract services tend to be expensive compared with the cost of using owned equipment if the scale of operations is rather larger.

needed by larger farms, or that mechanization should be applied in a different manner on small farms. For mainly arable farming, the tasks and the consequent equipment requirements, do not vary much with size of farm and there is little point in considering different types of mechanization. On the other hand, on other farms, there is a definite change in the make-up of output with decreasing size of farm, and consequently a different work pattern. This change is to some extent followed by a change in machinery usage (e.g., tractors are used more as haulage vehicles and less for ploughing). The question whether the type of equipment and machinery available is sufficiently adapted to the small farmer's future economic and operational needs might perhaps be studied with advantage against the background of the changes he must make to improve the economic efficiency of his farm. He must, for example, be in a better position to use his own labour more effectively in order to increase output.

There may also be organizational solutions to the difficulty of applying mechanization economically to small farms. It may be possible to extend machinery sharing or co-operative systems to overcome the difficulties of underuse of machinery[17]. The economic relationships between such systems, the use of contractor services and the capital and running costs of machinery owned by the small farmer require further study.

LAND TENURE

In this country during the present century, the traditional system of landlord and tenant has been contracting, and the proportion of farmers who are owner-occupiers has increased. The trend since 1911 is shown in Table XVI below[18].

TABLE XVI

Farms in England and Wales in possession of owner-occupiers as a percentage of total number and area of farms

Year	By No. of holdings	By acreage
1911	12·8	12·1
1927	36·6	36·0
1941*	33·6	33·0
1950*	39·1	37·9

*These refer to holdings of 5 acres or more.

At present probably over 40 per cent of holdings are in the possession of owner-occupiers and there is no evidence that the trend towards owner-occupancy is being reversed. The incidence of owner-occupation is greatest among smaller farms; of those under 50 acres only slightly less than half are farmed by the owner. At the other end of the scale, less than one-third of the farms over 200 acres are in owner-occupation. Detailed information is available from the World Census figures for 1950 (Appendix H).

The relevance of this increase to the question of farm size and efficiency is not directly obvious. The current increase in the number of owner-occupiers cannot really be taken as proof that this form of tenure is the more efficient one, since it is very largely due to the control of agricultural rents, and the low return on money invested in land that has resulted from it. There are a number of advantages in owner-occupation—the complete control of the farm, the incentives towards improving the property, pride of ownership etc.—and a number of

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disadvantages—the need to provide sufficient capital for both the purchase of the farm and the running of the business, the specialized knowledge of estate management which is required, the greater difficulty and expense of moving up the farming ladder when transferring to a large farm—and there is no *a priori* reason for supposing that the advantages are greater or less than the disadvantages.

In order to examine the economic results of a sample of farms according to the nature of the tenancy, an analysis has been made of the farms in the Farm Management Survey[14]. All those which were part-owned and part-rented have been excluded and the remaining 1817 farms have been grouped into those farmed by owner-occupiers (647) and those farmed by tenants (1170). Table XVII.

TABLE XVII

Comparative results of a sample of 1817 farms classified according to tenure (Farm Management Survey 1957/58)

	Gross output	Net output	Net income	Value of labour of farmer and wife
Per 100 acres—owner-occupied				
	£	£	£	£
0–100 acres ..	4800	3200	990	630
100·1–300 acres ..	3700	2700	770	210
300·1 acres and over	3100	2500	650	50
Per 100 acres—tenanted				
	£	£	£	£
0–100 acres ..	5300	3500	1300	670
100·1–300 acres ..	3800	2800	880	210
300·1 acres and over	2400	1900	510	50
Tenanted farms as percentage of owner-occupied farms				
	Gross output	Net output	Net income	Value of labour of farmer and wife
0–100 acres ..	110	110	130	110
100·1–300 acres ..	100	100	110	100
300·1 acres and over	77	78	80	110

The table shows, that for this sample, farms of small farms (up to 100 acres) achieve higher outputs and higher net incomes per acre than owner occupiers of farms in the same size group. For the larger farms this trend is reversed, those farmed by owner occupiers obtaining higher outputs than tenanted farms. These differences are not due to bias in the sample (for example, because of a greater proportion of small owner-occupied farms on poor, low yielding land as compared with tenanted farms in the same size-group) so far as the data permits

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this to be checked. The figures incidentally fail to support the view that small owner-occupiers tend to put more of their own labour into their farms; for this sample the reverse appears to be true.

A good deal of further research is required to show why these differences exist. It may well be that in seeking a tenant the landlord of a small farm is usually able to select men of above average ability whereas men with below average ability may have to become owner occupiers if they wish to farm. Another factor likely to be important is that of the level of capital available. The figures of working capital which are shown in the Farm Management Survey data are incomplete. Nevertheless, it seems quite possible that the average tenant has more capital because he does not need to invest any of his resources in the purchase of the land he farms. Furthermore, by the time a mortgage has been repaid by an owner occupier he may have lost his incentive to expand output and income.

ROLE OF SUBSIDIES

In comparing the economic efficiency of different categories of farms the amount of output per unit of input can only be measured in money terms. It is therefore dependent upon the price mechanism which, in the world of agriculture today, involves much more than ordinary market prices. If the effect of these non-market prices was simply to raise or lower the prices of agricultural products (or inputs) by proportionate amounts, there would be no difficulty so far as a comparison between various groups of farms was concerned, but this is not the case. Government measures of assistance to agriculture have resulted in the prices of some products being raised proportionately more than others. Furthermore, production grants, affecting the profitability of production, are not equally applicable to all sizes and types of farms.

The comparison is made more difficult by the fact that the methods of intervention in the process of pricing agricultural products are varied and often indirect, and in many cases, it is almost impossible to assess accurately the effect of this intervention. For instance, the way in which monopolistic powers conferred on the Agricultural Marketing Boards by the Agricultural Marketing Acts has been exercised have raised the prices of the products concerned. It is, however, extremely difficult to assess quantitatively the extent of such price increases or to say how far the Boards' operations have affected the value of the output of different size groups of farms. Similarly, the tariffs and import quotas associated with agricultural products have led to higher prices for British farm produce than would otherwise be the case, but again it is not possible to measure these increases.

The most that we have been able to do is to take a sample of farms (in East Anglia and Wales) and express the effect of the amount paid in government subsidies for the various products guaranteed under the Agriculture Acts, 1947 and 1957 as a percentage of gross output for groups of farms of different size and type. We have used as our data details of Exchequer assistance (Appendix I) and the actual direct grants and subsidies paid to the individual farmers (excluding capital grants). The results are set out in Table XVIII.

For any given type of farm the amount of subsidy received per £100 gross output does not vary significantly as the acreage increases. It does, however, vary by a very large amount between farms of various types; for example, prices paid to milk producers are maintained by the operations of the Milk Marketing Board and by Government control of liquid milk prices, rather than

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TABLE XVIII

**Subsidies in £ per £100 gross output by size and type of farm
(East Anglia and Wales 1957)***

Type of farm	Acres			
	0–99	100–199	200 and over	All farms
Dairy (better land)	15	12	14	14
(poor land)	14	16	21	16
Mixed (better land)	20	18	20	20
(poor land)	24	24	23	24
Livestock rearing (better land) ..	33	33	29	31
(poor land) ..	35	34	33	34
Arable cereals	19	20	21	20
Pig and poultry	23	26	27	25

*For certain commodities, the information given relates to the financial year 1957/58, for
others for the cereal year to the end of June, 1957.

by direct subsidy. From this and such other evidence as we have examined, there
appears no reason to believe that the small farm has received an undue propor-
tion of the total subsidies paid to agriculture.

REFERENCES

1. National Farm Survey of England and Wales, H.M.S.O. 1956.
2. National Investigation into the Economics of Milk Production.
3. Farm Management Survey, Comparative Tables. Department of Agricultural
   Economics, University College of Wales, Aberystwyth.
4. Farm Management Survey (Eastern Province) School of Agriculture, University
   of Cambridge. Analysed from original records 1955–56.
5. WARD, J. T. Measuring Changes in Farm Sale Prices. *The Chartered Surveyor*,
   December 1957.
6. CHISHOLM, M. D. I. Agricultural Economics Research Institute, University of
   Oxford. *Personal Communication.*
7. CHEVELEY, S. and PRICE, O. Capital in United Kingdom Agriculture—Present
   and Future. *I.C.I. Ltd.*, December 1955.
8. PRICE, O. Central Agricultural Control I.C.I. Ltd. *Personal Communication.*
9. KENDALL, M. G. The Financing of British Agriculture. *Journal of the Royal
   Statistical Society*, CIV, Part II, 1941.
10. CLARK, J. and BESSELL, J. E. General Report on Costings Data for 1954. *C.A.C.
    Technical Report No. 31, I.C.I. Ltd.*
11. Agricultural and Machinery Census. Ministry of Agriculture.
12. SLATER, J. K. W. Survey of Tractor Usage. *National Institute of Mechanical
    Engineering.*
13. Farm Management Survey (Eastern Province 1955–56) School of Agriculture,
    University of Cambridge. Analysed from Original Records.
14. STURROCK, F. G. Farm Mechanisation, September, October, November and
    December, 1955.
15. SYKES, J. D. Department of Agricultural Economics, Wye College. *Personal
    Communication.*
16. WALLACE, D. B. School of Agriculture, University of Cambridge. *Personal
    Communication.*
17. CULPIN, C. Farm Mechanisation Management, Crosby Lockwood and Son, 1959.
18. Analysis of the Welsh Farm Management Survey Data (see ref 3 above). Prepared
    by E. A. Attwood.

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THE FARMER AS A FACTOR AFFECTING
ECONOMIC EFFICIENCY

GENERAL

It has not been possible to determine the extent of the penalty which material factors necessarily impose on the economics of production of small farms. These factors certainly make it harder for the small farmer to achieve a satisfactory income, than they do for his neighbour with more acres. He can, however, often partially overcome them; the theoretical capital cost of machinery is too high to permit the small farm to afford that degree of mechanization which would pay on the larger farm; but the small farmer generally manages to adapt his pattern of output and his methods so that his actual machinery costs per unit of output are much the same as on a larger farm. We must however, look beyond the material factors to the farmer himself, and to the way in which his decisions affect the material factors and the economy of his farm business: in other words, to his performance as a manager.

It is generally agreed that there is a very wide "spread" of management skills within the farming community, and that this is a principal cause of the great disparity in incomes within any group of comparable farms. Unfortunately, very little information of a systematic kind (none on a national scale) exists about the economic effects of different levels of management efficiency in agriculture. In this section, therefore, we can do no more than comment on the topic generally, review the information available and suggest how the many unresolved problems might be related to certain aspects of the psychology and sociology of the farming community.

CONTENT OF MANAGEMENT IN FARMING

Two aspects of the skill and efficiency with which a farmer operates his business may be distinguished:

(a) the degree to which he is able to co-ordinate all the activities for which he, as an independent farmer, is responsible (management skill);

(b) the technical skill he brings to bear in the operation of his farm.

Management and technical skill are both involved. For example, a farmer may be very efficient in the performance of a particular farm operation, but inefficient in that he selects that particular method instead of alternative methods which produce a better return. This is true of both the policy and the day-to-day aspects of farm management, although in the determination of policy, skill in economic management is particularly important.

Economic management

Basic management skills are difficult to define in practice. Broadly, the farmer, like any other businessman, is faced with the problem of combining the separate factors of production at his disposal in such a way that the minimum inputs are needed for any given level of output. As the economic environment in which

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he operates is constantly changing, the farmer must be constantly reappraising both the type and scale of his various enterprises and methods. Although some of the uncertainties about future prices have been removed by the Government's long-term assurances to agriculture, some short-term fluctuations remain, as well as the underlying long-term trends. An ability to interpret the changing pattern of prices and costs, and to foresee trends, is therefore important. To be effective, this must be associated with the enterprise and initiative to make the changes which seem to be necessary. Studies both in the United States and in Britain suggest that investment opportunities are missed in farming because farmers are not prepared to make these changes[1], [3]. In one study this lack of adaptability has been found to be more common in small farmers than in large, and this has been the main reason why the disparities in income have increased in recent years[4].

Technical management

The farmer's performance depends upon his technical knowledge, his judgment and his skill of execution. Recent developments in agricultural research have been so far-reaching that the farmer needs to have a substantial body of technical knowledge at his command; and if the opportunities presented by new techniques are to be fully exploited his knowledge must extend beyond that required for the efficient management of his existing enterprises. Moreover, most farmers are fully involved in the day-to-day work of their farms and must themselves be able to put the farm's policy into effect and do so at the appropriate time. For this an ever widening range of farming skills is required. For example, many farmers in recent years have added a small flock of sheep as a supplementary enterprise; very often the farmer himself acts as shepherd and, given an adequate knowledge of the control of sheep diseases, has done so with relatively few difficulties.

Personal management factors

Technical and economic management skills are not the only important attributes of the successful farmer. The skill of organizing and managing labour—of leading rather than driving the team—is also important, particularly on the larger farm. The ability to bargain successfully is another important attribute of a successful farmer. Thus, unless is part of the innate character of the farmer, is to a large extent, is a quality which can neither be taught in an agricultural college nor developed on the farm.

MANAGEMENT REQUIREMENTS AND SIZE OF BUSINESS

Quality of management and size of farm

The type of management and technical skills required will in general be different on small and large farms. For example, skill in handling hired labour is not important in a small family business but is critical to a large farmer employing ten or twenty workers whose tasks must be carefully supervised. Nevertheless, the level of management skill required is not directly related to the size of the farm business. The ability to combine the factors of production, planning, enterprise, technical knowledge and judgment are always important. The more diversified the operation of a farm, however, the wider the need for technical knowledge and managerial skills. On large farms which have a number of enterprises, the minor day-to-day decisions can be delegated, leaving

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only the main policy decisions for the farmer himself. Other large farms concentrate on one or two enterprises simplifying management. On small farms there can be no delegation of managerial responsibility, and, where they constitute intensive businesses, the small farmer has complex management problems. Moreover, he usually has a greater burden of manual work which limits his opportunities for learning about new techniques and for considering and discussing the opportunities which are open to him. In short, therefore, the intensive small farmer's management problems, though smaller in scale, are quite as difficult as those faced by the large farmer and often become more complex as intensification increases to achieve a given level of profit per holding.

Increasing risk as a management problem

The farmer with only a few acres can overcome some of the inherent disadvantages if he is willing to intensify his operations. This intensification will, however, not only lead to an increase in his potential profits; it will also increase his potential losses. The evidence of American surveys is that farmers tend to feel that raising their farm output by increasing their acreage spreads the risks, but raising output by increasing the intensity of their farming multiplies them. Moreover, where increasing intensity means having a higher proportion of borrowed capital in the business, the possibilities of a farmer losing his own capital are increased. As E. Heady has put it[4] "Since bankruptcies are irretrievable, the spectre of a vanishing equity always haunts the farmer; once the firm is liquidated the manager cannot simply roll the wheels of chance once again to let the probabilities catch up and borrowed capital itself imposes uncertainty on the firm. The entrepreneur who can borrow funds must arrive at some subjective equilibrium, selecting an acceptable combination of prospective profits and uncertainty (or possible losses)".

MEASUREMENT OF MANAGEMENT ABILITY

Profitability may be accepted as a satisfactory index of management, provided that the influence of the physical factors can be discounted and this could only be assessed by means of very detailed surveys, which have not yet been made on any scale. Limited studies of this kind have, however, been made and the results of one such study are given in Table XIX below[4]. In this study a group of 280 dairy farms was selected from the Farm Management Survey sample for England and Wales, 1953/54; these farms followed a system of grassland farming and derived over 60 per cent of their income from milk. They were compared with a special investigation sample of 40 farms which also obtained at least 60 per cent of their income from dairying but for which the level of management was higher.

The two groups of farms had, we judged, similar levels of capital investment at the beginning of the study (both landlords' and tenants' capital per acre). Moreover, while the average sizes of the two groups were not identical, they fell within approximately similar size ranges so that any physical effects of scale were unlikely to have much influence on their relative economies. The outputs of the farms were also reasonably similar in their nature and to judge by total costs the intensity of farming was about the same. The difference in their economies ought therefore to be largely the result of differences in management.

This study shows that by better management the rate of profit can be considerably improved. The figures illustrate the importance of selecting the

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TABLE XIX

Comparison of economies of two groups of farms under different management systems

			Grassland management investigation sample	Farm management survey sample
			acres	acres
Average size of farm	..	..	160	110
			£ per adjusted acre	£ per adjusted acre
Average gross output	..	..	56	47
Average inputs:				
Purchased feed	..	..	13	16
Fertilizer costs	..	..	3·6	3·5
Labour costs	..	..	18	17
Gross income	..	..	60	52
Gross charges	..	..	43	41
Farm income	..	..	17	11
Ratio of gross income to gross charges (gross charges=100)	..	..	140	127

best *combination* of inputs. The high management group had a higher gross output and a net farm income which was two-thirds greater than the Farm Management Survey group, although total costs were about the same.

Management differential in practice

It is of interest to consider whether there is any evidence for differences in the *actual* level of management skill encountered on small and large farms. Here, there is little specific information available but there are a number of general indications which suggest that substantial differences in management by size of farm do exist. Unfortunately, the differences are the reverse of that which the situation requires: that is, a number of small farms appear to be managed with less awareness of the economic need for efficient management than large farms. For example, a recent study of small farms in Yorkshire[4] showed that their operators regarded themselves as manual workers and were generally content if their holding gave a return comparable to the wage of manual workers in other industries. "A large surplus over and above the value of the labour employed is not looked for, and provided there is enough for maintenance of buildings, and equipment, few farmers are much concerned about the rate of interest earned on their capital." These farmers were not apparently motivated primarily by business considerations.

Differences in the level of technical performance by size of farm are also difficult to identify. Owing to the difference in the pattern of production between small and large farms, even within a given type of farming, comparisons of amount of feedingstuffs and fertilizers used are unlikely to give any reliable information on overall technical performance. Relative measurements of the efficiency with which particular farm operations could be carried out (in terms of time, cost and yield from the operations) are theoretically possible, but do not appear to have been made. Such measurements should, for instance, throw light on the economies of scale in the use of machinery, and provide further information on substitution of labour by machinery on small and large farms. Another

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important factor in technical performance is the rate at which new techniques are adopted. This depends on the amount of information reaching the farmer, his attitude to it, and his judgment on the applicability of this information to his circumstances. A considerable amount of work has been done on these lines in the U.S.A., including an assessment of the position of the farmers concerned in the community[1], [4]. Generally those farmers at the top end of the scale, the innovators, were those with larger farms, a large amount of risk capital, better education and higher social status, while the non-adapters were older and less educated, and participated less in community organizations. Such work as has been done in the United Kingdom on this topic broadly supports these conclusions[8], [16].

Some information is available on the use of fertilizers and weedkillers, and on animal health and yields of crops which may be taken as partial measures of technical performance. As none of these studies has isolated the effect of individual aspects of management and few have related the effect measured to the net cost involved, their value as indices of technical performance is limited. Results may be summarized as follows:

(a) *Plant nutrients*[1]. The lime, potash and phosphate usage on the small farm is not markedly different from that on the large farm. If allowance is made for the nutrients supplied by farmyard manure the total amount of plant nutrient supplied per acre is much the same.

(b) *Weed killers*[14]. Weed killers are apparently more widely used on large farms than small farms, but this appears to be due to the proportionately larger acreage of cereals grown on large farms, and to the simplicity of spraying when the machine is actually owned by the farmer.

(c) *Health of dairy herds*[15]. In one survey, less than one-quarter of herds less than thirty cows were designated and milk-recorded, whereas, in herds of over thirty cows, the great majority were designated and over two-thirds were recorded. On the other hand, no great differences were found in the percentage of milk infected with the organism causing chronic mastitis in herds of different sizes. As the larger herds tend to use more vaccine, it may be inferred that the wider use of modern measures of disease control has been forced on the larger operator by the greater chance of large herds having these diseases.

(d) *Yields*. (i) A study of yields of wheat and barley in East Anglia[14] carried out in 1956 shows that the yield per acre is about 20 per cent greater for large farms than for small farms.

(ii) A similar study[15] of sugar beet yields in 1954 showed no significant difference by size of farm. This was probably due to the excellent advisory services available to sugar beet growers.

(iii) The National Investigation[14] into milk costs indicates that the average yields of the larger herds are slightly higher than those of the smaller herds.

(iv) The Hill Sheep Survey[17] carried out in Wales shows that the productivity of sheep (in terms of lambs weaned per 100 ewes) is appreciably higher for the smaller flocks (those under 200 ewes).

SOCIAL ASPECTS

Indirect evidence bearing on the question of management and a possible explanation of its apparent deficiencies on the average small farm, may be obtained by considering the farmer's social background, his education and training, and the opportunities afforded to farmers to rise in their profession.

Farming is overwhelmingly an inherited profession. About three-quarters of

farmers in England and Wales are farmers' sons, and the majority of these succeeded their fathers on the same farm[1]. The farming community also extends laterally through blood ties and ties by marriage, and in depth over several generations. (There is insufficient evidence to show whether this social pattern is more or less marked for different sizes of farm.) Results of sociological investigations which possibly throw some light on the management question are summarized in Appendix J. We have selected two sociological aspects as being of particular importance in this connection: education and training, and the existence of a so-called "farming ladder."

Education and training

Only a very small proportion of farmers appear to have had any formal training for their job. From a survey[1] of some 2000 farmers in 1944, some 3 per cent had been to an agricultural college or institute and about 7 per cent had had some formal practical training as a pupil on a farm. The vast majority had received their training by working on their father's or a relative's farm. The sample from which the survey was made was drawn irrespective of size of farm, but it can be taken as fairly typical of medium-sized farms. Small farms would probably have shown a lower percentage of graduates.

More recent information indicates that the position is substantially unchanged for graduates and holders of diplomas, but that the numbers of farmers having had training at farm institutes has increased to some extent. Graduates and diploma holders are also employed as farm managers and bailiffs, but their number is not large. Very few of the present increased number from the Agricultural Colleges and the Universities are taking up farm management.

The fact that only a very small proportion of farmers have had any formal higher education for their job has two main deleterious effects, particularly for small farmers (if it can be assumed that the smaller farmers have the least educational opportunities). They have missed systematic instruction in modern techniques, and they know little of scientific method. Their horizons also tend to be limited.

The farming ladder

It is often argued that the present size pattern of British agriculture, with its large number of small units, provides good opportunities for young men who are keen and efficient, but who lack capital, to rise steadily in the profession, accumulating valuable managerial and technical experience on small farms which will stand them in good stead when they are able finally to graduate to larger farms. The scanty information available does not support this argument. Leaving aside the questionable premise that managerial experience on a small holding or small farm is useful training for agricultural enterprises on a large scale, the so-called farming ladder does not at present appear to work. Shortage of farms to rent, shortage of capital, and a lack of ambition and ability are factors which contribute to this. There is, it is true, evidence that small-holdings provide some opportunity for farm labourers to move on to the first rung of the ladder. But, although between one-tenth and one-eighth of farmers have been farm labourers, some of these are farmers' sons and would have succeeded to the family farm in due course and the proportion of true farm workers is probably much smaller than this. In any event, only 1–2 per cent of farm labourers subsequently take over a farm. Thus the "ladder" for virtually all farm labourers stops at the bottom rung.

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The evidence of movement between farms indicates that, while farmers who start on a small farm are sometimes able to move to a larger farm or add more land to their existing acreage (between one-tenth and one-fifth in one sample[47]), the possibilities for advancement from a small farm to a medium-sized farm and finally to a large farm are very rare today, certainly less than is commonly believed. In most cases where there had been more than one move the second was to a smaller farm in late middle-age. The young such farm farmer who is able to start on a small-holding or small farm of 30–50 acres has some opportunity, by hard work and saving, of graduating to a farm of up to 150 acres in size, but there appear to be relatively few cases of progress beyond this, certainly considerably fewer than there were in the period between the wars.

The small farm

Briefly the main social features of small farming communities are as follows. The average owner or tenant of a small farm is usually of middle age, having succeeded to his farm when he was 35–40; in a survey of 1400 farmers in the remote and upland areas of mid-Wales some two-thirds were over 50 years of age[49]. Very few have received more than an elementary education. They rarely leave their neighbourhood (except perhaps to travel to an agricultural show once or twice a year). They gain their knowledge of developments in agriculture mainly from the weekly agricultural press, but mainly by talking to neighbours and seeing how they tackle similar problems[51]. For various reasons they have less contact with the advisory services than their neighbours in a larger way of business.

We wish to make two general points on the resultant shortcomings in management:

(a) There is likely to be widespread ignorance among small farmers of the economic considerations involved in running a farm for maximum profit. We would not wish to assert that any substantial proportion of small farmers is technically incompetent in the narrow sense. It is, rather that they have not the necessary knowledge to be able to combine the factors of production most economically or to be aware of and judge between the alternative courses which might be appropriate to their particular circumstances.

(b) In very many cases they are not primarily concerned to obtain the maximum profit from their business. Their primary motivation is often not financial, but is, security, independence, leisure, prestige.

Little detailed work has been done on the farmer's attitude to information, or to his motivations generally. One small-scale study confirms, however, that, while small farmers were by no means uninformed of technical developments in agriculture, they generally failed to apply this to their own circumstances[51]. The same study showed that few resorted to the N.A.A.S. for advice and assistance and the impression gained was that the reason lies less in the small farmer's inability to absorb information or advice than in the psychological attitude he adopts towards it. He is more often concerned primarily with the security of the farm itself (in the sense of maintaining the continuity of the family connection with the land) than with making the maximum profit[51]. The reluctance of many small farmers to borrow additional capital is an illustration of this. The strong ties which the small farmer has with his land by virtue of his background, the prestige of being a farmer within a closed community, the

sense of continuity with the past, and the pride in being independent and to some
extent separate from the industrial life of the nation, all constitute strong
alternatives to the profit motive. Attempts to improve the small farmer's
economic efficiency depend, it would seem, as much on his being aware of the
economic factors involved as in a convincing him of their importance.

REFERENCES

1. McFarlane, G. C. Some Observations on Farmers' Attitudes to Finance and
   Investment. University of Bristol, Department of Agricultural Economics,
   November 1957.
2. Heady, E. O. and Swanson, E. R. Resource Productivity in Iowa Farming with
   special reference to Capital Use in Southern Iowa. *Res. Bulletin* No. 388, Univer-
   sity of Iowa, June, 1952.
3. Thomas, W. J. Post-war Agricultural Policy in the United Kingdom. (Manchester
   Statistical Society.) December 1958.
4. Heady, E. O. Economics of Agricultural Production and Resource Use. (Prentice
   Hall, New York 1952).
5. Clark, J. and Bissell, J. E. No. 7 Profits from Dairy Farming. *C.A.C. Bulletin.*
6. University of Leeds. The Small Farms of Industrial Yorkshire. Economics
   Section, Department of Agriculture 1958.
7. Sub-Committee for the Study of Diffusion of Farm Practices. How Farm People
   accept new ideas. Agricultural Extension Service, *Special Report* No. 15. Iowa
   State College November 1955.
8. Sub-Committee for the Study of Diffusion of Farm Practices. The Diffusion
   Process. *Special Report* No. 18. Iowa State College, March 1957.
9. Smith, H. T. E. The Communication of Ideas to Farmers' Agricultural Progress.
10. Dadd, C. V. and Osborne, L. W. Factors affecting the choice of Cereal Varieties.
    Outlook on Agriculture, Vol. II. No. 1.
11. Rothamsted Experimental Station. Survey of Fertiliser Practice (unpublished).
12. Boyd, D. A. Weedkiller usage in England and Wales: information from surveys
    of farm practice. *Proc. Brit. Weed Control Conf.*, 17–32 (1957).
13. Withers, F. W. Peck, E. F. and Lack, F. B. A Survey of diseases and losses in
    dairy cattle in Wiltshire and Devonshire. *Vet. Rec.* (In the press) (1959).
14. Nix, J. S. Wheat and Barley Cost and Returns 1956. *Report No. 54, Farm
    Economics Branch,* School of Agriculture, Cambridge 1957.
15. Nix, J. S. Sugar Beet Costs and Returns 1954. *Report No. 42 Farm Economics
    Branch,* School of Agriculture, Cambridge, 1956.
16. ——. Costs of Milk Production in England and Wales. October, 1955 to Septem-
    ber 1956. *Production Economics,* Milk Marketing Board.
17. Dummer, M. H. General Report on Costs and Returns for 65 Hill Sheep Flocks
    for 1954–55 and 1955–56. *Economics Studies in Sheep Farming in Wales, No. 1.*
    Department of Agricultural Economics, University College of Wales, Aberystwyth
    1957.
18. Ashton, J. The Recruitment of Farmers in England and Wales (B. Litt. Thesis,
    University of Oxford) 1955.
19. ——. Agricultural Information and the Farmer, *Wartime Social Survey.*
    (H.M.S.O. 1944).
20. ——. *Mid Wales Investigation Report*, Cmd. 9631. H.M.S.O. 1955.
21. Carpenter, E. M. "Small Farmer", *Journal of Agricultural Economics Vol. 13*
    No. 1, 1958.

PART VI

SCALE OF ENTERPRISE—SUMMARY

In this chapter we summarize our conclusions about the relations between size of farm, scale of enterprise and economy of farm production.

GENERAL

Size and distribution of holding

The important facts about the division of agricultural land are:

(a) 80 per cent of holdings are below 100 acres of crops and grass but this very large proportion accounts for only 30 per cent of our total farmland.

(b) Both the very small holdings and the larger holdings have declined in numbers in this century, but the latter have increased slightly since 1920. Holdings of 50–100 acres have, on the other hand, increased in numbers since 1900. The total number of holdings has decreased over the period.

(c) In lowland England the better land tends to be divided into smaller units than the poorer land, although in all districts large and small farms occur side by side. In the more remote and upland areas of Wales, Northern and South-Western England the smaller farms tend to be concentrated on the poorer land. If the pattern of land distribution followed the economics of production the least productive land would be grouped into the larger farms, as it is in some parts of the more recently-developed countries, e.g. such as Canada and the United States of America.

Scale of enterprise and farm size

Because most small farms go in for more intensive production than large farms, they are responsible for a greater proportion of total agricultural production than would be expected from their acreage. The proportion of total production of particular commodities for which small farms are responsible differs considerably between commodities. For example:

(a) holdings of under 100 acres produce nearly half of all agricultural output in England and Wales but about one-eighth of this comes from those of under 20 acres; the small farms of 20–100 acres, therefore, produce about one-third of the total.

(b) holdings under 100 acres account for over two-thirds of the total number of adult poultry, over one-half of pigs, nearly half of the national dairy herd and about one-fifth of the cereal acreage.

ECONOMIC CONCLUSIONS

The conclusions set out below are based largely on an analysis of the published Farm Management Survey data, but there are difficulties in using this data to produce average results for size or type groups. Wide deviations from the averages of the economically important quantities (outputs, inputs, and incomes) when grouped by sizes or types of farm reflect the great heterogeneity

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of the agricultural industry and indicate the difficulties in applying measures of economic efficiency. The following statements, must, therefore, be applied with caution to any particular farm or farmer.

Economy of production

In judging the relative efficiency of different sizes of farm and scales of enterprise, it has been made of calculations of output per unit of input, and of inputs of resources per unit of output—all in monetary terms.

(a) The value of the resources used to produce £100 of output, other than the value of family labour, is much the same on small and large farms, except that the small farmer spends more on feedingstuffs and less on fertilizer.

(b) When the value of the farmer's own labour is taken into account small farms are on the average less economic in their production than large farms: their total costs are greater per £100 of output produced.

(c) The basic cause of the lower economic efficiency of the average small farm is that overhead costs, and in particular family labour, are too high in relation to the output obtained. The small farmer can, to some extent, overcome this inherent difficulty by increasing his output but many of the methods he now uses to increase intensity very much increase his variable costs (e.g. purchase of concentrated feedingstuffs). An increase in intensity on small farms to improve farm incomes requires a high level of enterprise and management skill, and great capital resources.

(d) Different types of farming vary greatly in their economy of production. On small farms below 100 acres, livestock-rearing enterprises have in recent years been the least profitable and arable farms the most. Dairying and mixed enterprises are intermediate. A major reason for these variations is the difference in intensity of farming systems; these arise from differences in soils and climate.

(e) As a rule farms below 50 acres of all types other than "specialist" enterprises show a loss when the full cash value of the farmer's own labour is taken into account.

(f) The "economies of scale" found in the larger farms of the sample do not appear to extend much above 400–500 acres except possibly for large arable farms.

Farm incomes

(a) The average net farm income, including the reward due to the farmer's own labour, on a sample of very small farms below fifty acres was £480 per annum (1957/58). Farms of over 500 acres produced an average income of over £3000 per annum.

(b) Mean incomes for a given acreage vary greatly between types of farm. The income from a 100 acre arable farm is on the average twice that for a livestock farm of the same acreage.

(c) There are considerable fluctuations from year to year in the mean income within each size and type group.

(d) There is a very wide spread of net incomes about the mean within each size group. Examples of high net incomes (£2000 per annum) on small farms show that the small farmer can succeed in overcoming the factors making for a relatively low efficiency of production.

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Many factors interact in bringing about the difference in economy of production between small and large farms. Some of these are external to the farm; for example, the greater size of his business enables the large farmer to buy and sell on relatively better terms than the small farmer. These external factors have, however, only a very small effect on the cash values of total inputs and outputs which are used to make economic comparisons.

The main factors considered in this study fall into two groups. On the one hand, the more readily measureable "material factors" (viz. capital, mechanization, labour use) act on the economy of production in such a way as to favour the large farm. At a given level of management, therefore, the large farm should be more efficient as an economic unit than the small farm. Nonetheless, a very high level of management on the part of the small farmer can overcome the effects of the "material factors" enabling his farm to be as efficient economically, as larger units. It is, however, difficult to equate the management skills required on the small farm with those on the large farm. The effects of both groups are summarized below.

Labour use

Small farms which, for physical reasons (soil or climate) or because of unsatisfactory management, can only obtain a low total output are almost invariably inefficient in the economic sense in their use of labour, as the amount of labour which is available on these farms is to a very large extent independent of their requirements. On many small farms the surplus is often employed outside the farm (e.g. on part-time farms). On the other hand, on large farms, where most of the labour force is hired, labour use can be more readily geared to requirements for any given level of output.

Capital

(a) The greater intensity of production required of small farms demands both greater long and short-term capital expenditure per acre. We do not know how far the present level of capitalization diverges from the optimum. Tenants on small farms are generally able to reach higher outputs and considerably higher incomes than owner-occupiers. Among the reasons for this are that tenants, unlike owner-occupiers, may be selected and they are less likely to be short of capital.

(b) Prices per acre for small farms remain higher than those for large farms, although in recent years the difference between them has narrowed, because of the increased demand for large farms. Nevertheless, prices for small farms with vacant possession remain high in spite of the poor return per £1 of farming capital invested. Non-economic considerations are involved: apart from the accommodation aspect, the prices paid evidently reflect an intangible value placed on the ownership of a small farm.

Mechanization

In terms of numbers of tractors and of machine usage per 100 acres there is an obvious economy of scale in favour of the large arable farms. However, the small farmer's mechanization costs per unit of production are not very different from those of the large farmer. He overcomes the penalty imposed by smallness by:

(a) relying more on livestock products which do not utilize much farm machinery than on crops;

(b) buying second-hand farm machinery and using his machinery longer, so reducing his depreciation costs;

(c) relying to a greater extent on contractors' services.

Subsidies

The proportion of income due to subsidies is predominantly a function of choice of product (type of farming) rather than size of farm. So far as we have been able to determine, the amount of subsidy relative to output does not vary with farm size, but the existence of subsidies is of greater importance to a small farmer owing to his lower income.

Management skills

(a) Management skills required vary with size of farm. The small farmer has a simpler task in achieving an adequate level of day-to-day management than the large farmer either because he is closer to the practical problems he has to solve or because he can supervise directly such labour as he employs. The large farmer is less committed to full-time manual work but, in so far as he has to delegate some of the day-to-day management decisions, he loses the advantage to be gained by close contact. On the other hand he is able to "buy" additional skills.

(b) To obtain a given level of income, the small farmer must make a higher profit per acre than the large farmer. To do this he must achieve a high standard of planning and management. In particular he is faced with difficulties in planning the best combination of resources for the most economic production, because:

(i) on small farms there are diseconomies owing to the indivisibility of units of labour and machinery;

(ii) increasing intensity on small farms places greater emphasis on the need to ensure that the additional variable costs incurred do not rise more rapidly than the extra output—in view of the tendency to diminishing returns in agriculture this is a very real problem for the small intensive farmer;

(iii) the small farmer has a narrower choice of possible enterprises than the large farmer—he cannot undertake those which are extensive in their needs for land.

(c) The level of the technical skill of small farmers is probably equal in most respects to that of the large farmers. Small farmers, however, appear to be generally slower to adopt new ideas.

(d) The average level of incomes indicates that the management skill of many small farmers is insufficient to enable them to overcome the difficulties imposed by the small size of their holdings.

(e) Many farmers, both small and large, who are least successful as managers are either not motivated by the desire to maximize profits, or do not have the necessary business ability to realize the possibilities of doing so; this lack of business ability appears to be more important than particular deficiencies in technical knowledge.

(f) The farmers' background and training are important in determining his attitude to farming and the ability he brings to the management of his farm. For example, most small farmers have had little opportunity of receiving formal agricultural training and education and tend through upbringing and environment to be restricted in both their ambition and outlook.

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PART VII

DISCUSSION OF THE SMALL FARM PROBLEM

The economic development of the more advanced countries has been characterized by a tendency for the production of foodstuffs to expand faster than effective demand; incomes and standards of living go on rising, but at a certain point the demand for raw foodstuffs ceases to expand. It therefore becomes more difficult to secure increases in farmers' real incomes, corresponding to increases in real wages elsewhere and there is insufficient profit to provide the present number of farmers with a satisfactory living. In agriculture, unlike manufacturing industry, social factors operate to some extent in opposition to economic forces and there are, therefore, special reasons in agriculture why the distribution of land between farms (the size pattern) is slow to adapt itself to economic change. This problem is faced in greater or lesser degree by most countries in Western Europe, and in many cases regrouping of the productive units is being encouraged by legislation. In this country the problem has become known as the "small farm problem" or "the small farmer problem".

In this section, we attempt to relate our examination of the relation between size of farms, volume of farm business and economy of farm production to this crucial problem of agricultural organization and development. The great majority of farms in England and Wales are small. They are responsible for a greater proportion of the nation's agricultural production than their total acreage would suggest because they are more intensive, particularly in livestock products. The problem of agricultural organization implicit on the small farm problem is therefore an important one, both socially and economically.

The analyses of the economic data shows that the total costs per unit of output are usually greater on small than on large farms if the value of the farmer's own labour is charged as an expense. However, if the value of family labour is excluded, the value of the other resources used per unit of output is much the same. Because of this, the average return for the small farmer's manual labour, management and capital, in terms of their income, is little or no better than a farm labourer's wage. The reasons for this are only partly due to the small physical size of their holdings, although this in fact imposes penalties on their economic efficiency; for example, it is more difficult to arrange the scale of the enterprise so that the optimum use is made of labour and machinery. Probably the most important reasons are the difficulties due to the interaction between such factors as labour use, mechanization, capital, and the level of skill in economic management displayed by the average small farmer. His skill as a farmer is in turn affected by his education and training.

Two methods of solving the "small farm problem" have been suggested. One is to reduce the total number of farms and increase the median size of holding. The other is to raise the economic efficiency of the average small farm to a competitive level without altering their number in order to provide the small farmer with a satisfactory income.

We have shown that there has important bearing on the economy of agricultural production and that changes with technical advances and improvements in managerial skill. Consequently, reorganization is a continuing

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need and, to achieve this, greater flexibility in the pattern of agriculture is vital. The problem, moreover, is not only one of altering the size pattern of farms (although this is most important); the layout of the fields and buildings of the individual farms will have to be reorganized to take advantage of technical discoveries and of changes in relative costs. Very little attention has yet been given to the optimum lay-out of particular types and sizes of farm, but the small farmer appears to face greater difficulties in replanning his holding because:

(a) the costs of replanning on small farms may be greater per unit of output;
(b) the sacrifices which have to be made by the small farmer during the period of reorganization may be too great;
(c) the small farm affords fewer opportunities for major economies in this respect.

We have shown also that the problem of increasing the efficiency of small farms, as opposed to medium or large farms, is primarily one of increasing output by intensification without necessarily increasing diversification. Increasing output on small farms must of course take account of market trends; output of unwanted commodities, especially at increased cost, will neither help the farmer nor be of benefit to the nation.

Whilst technical agricultural developments could help to improve the position of the small farmer, in so far as they produce increased output at constant cost or reduce the cost per unit of production, they will not *necessarily* improve the small farmer's competitive position since the medium and large farmer can also take advantage of them. Indeed, technical improvements often go into operation earlier on the large than the small farms.

Both types of approach to the "small farm problem" (reorganization and increased economic efficiency) entail a large number of practical difficulties. A policy designed to encourage amalgamation could only be effective slowly short of compulsion and attempts to quicken the pace will give rise to serious social problems. It is also unrealistic to expect improvements which call for a sudden increase in skill on the part of the average small farmer. Such information as there is about the farmer's attitude and his motivation, his receptivity to new ideas and his willingness to accept extra risk and worry for material ends, leads us to conclude that the practical problems of education and persuasion may have been underestimated. Further information is needed on the nature and extent of these problems. Much of the current discussion of ways and means of raising the small farmer's level of efficiency starts from the premise that the essence of the problem is technical knowledge, and that once the farmer has the know-how and some assistance with additional capital, a solution is in sight. This assumes that the small farmer is, and will continue to be, primarily motivated by the desire to maximize profit, and is willing to take the necessary business risks.

The two approaches to the problem are not necessarily incompatible. In discussing the "small farm problem" we are dealing with a very wide range of types and sizes of business and farmers of very widely differing attitudes and abilities. It is convenient to consider three classes of small farms:

(a) those which are being run as intensive business enterprises. These are usually found on the better land and it is fair to assume that the farmers concerned are motivated mainly by considerations of profit. These are referred to below as economic enterprises.

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(b) those which through their physical characteristics (e.g. poor soil) are unsuitable for any sufficiently intensive farming to yield a reasonable income by any methods yet sufficiently proven. The farmers concerned may or may not be mainly concerned to improve their profits, but the possibility of improvement is largely denied by the physical limitations of their farms. These may be termed the non-viable enterprises.

(c) those with, on the whole, favourable physical characteristics but which, owing to insufficiently high level of management, are not operating as efficiently as they could. These are referred to as potentially viable enterprises.

The first group do not constitute a problem; the farmers may in some cases require assistance and advice but in all probability they are already aware of this. The second group, the non-viable farms, are those for which financial assistance is unlikely to be of much help, and for which amalgamation or part-time farming is in the end the only practical solution. It is generally agreed that these non-viable farms should not be singled out for additional help in their present form. On the national scale this would mean a waste of resources, and could not in the long run provide sustained benefits for the farmers themselves. Indeed, special support for such farms may seriously mislead farmers' sons and would-be farmers. Whether or not measures should be taken to provide inducements towards amalgamation is an open question. At the moment the primary need is to determine the size of the problem and its social implications.

The potentially viable group presents the greatest difficulty. The Government's programme of assistance to small farmers provides essential financial and technical help, which, if used, will enable such farms to improve their economy of production. The ultimate success of these measures depends on the ability of the farmers concerned to take advantage of the help being offered to them. This in turn depends primarily on their basic attitude and motivation, and secondarily on their ability to assimilate new technical skills and to develop the necessary business acumen. If the potentially viable group of small farms is at all large, the need for advice on management particularly directed towards the small farmer's problems will be very important. Some other factors in the problem are discussed below.

Technical and managerial education

As agricultural production becomes increasingly complex, the need for better technical and managerial training for all farmers increases. The large farmers probably have better opportunities for more rapid assimilation of new skills, for they are not usually committed to the burden of manual work as is the small farmer. Yet the need for a high level of technical and managerial efficiency on the small farms is as great or greater than on large farms because of the great difficulties of management at intensive levels of output. Moreover, there seems to be less opportunity for the small farmer's son to be spared from home for periods of a full year compared with the large farmer's son (only 80 per cent of the places in 1957/8 at farm institutes in Wales were taken up). The prospects, therefore, of achieving better management on small farms through formal technical training at farm institutes or other centres of agricultural education do not appear to be bright. The recommendations of the recent de la Warr report with their emphasis on the need for day-release classes may help to rectify the position. At the other end of the educational scale, very few graduates

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in agriculture become farmers in their own right; this way of bringing new skills and up-to-date methods directly into the industry is not operating to the extent required.

The 'farming ladder' and succession

Such evidence as we have indicates that, in the post-war years, the so-called farming ladder has operated very ineffectively, and at most only within very narrow limits. One reason is the passing of farms from father to son regardless of technical knowledge and business ability. The hereditary nature of the small farm business, the trend towards less tenancy and more owner-occupancy, and the increased need for capital because of modern developments all aggravate the naturally low 'mobility' of land. All this means that the opportunities available to those with the necessary managerial skill and enterprise who wish to begin farming on their own account are limited.

Specialization

The need for greater intensity on small farms complicates the management problem, particularly the allocation of resources to the various enterprises. The intensive management of several small enterprises together may be more difficult than the management of one or two enterprises, whether intensive or extensive, especially if the scale of the business permits some delegation of responsibility. In theory, therefore, the management problems facing the small intensive farmer might be simplified if he could reduce the diversity of his operations and concentrate on one or two enterprises. There are obvious difficulties; of those the high level of capital investment that is usually required is probably the most important.

Occupiers of non-viable small farms and those on potentially viable farms who are unable, for personal reasons, to benefit much from the present programme of assistance, are hardly likely to escape serious economic difficulties. Their relative position will in fact tend to worsen as efficiency improves on small farms as it should if the present policy is successful. Any extra help which might be given to them on social grounds should be consistent with the national interest, which requires that the pattern of agriculture should be flexible enough to meet changing economic circumstances. Such help, if contemplated in the future, should not include differential income subsidies or other means of propping-up non-viable units, but might more profitably take the form of assisting those who wish to move out of agriculture.

The solution of the problem of non-viable holdings presents many social and economic difficulties, especially as many are content to farm at a level of profit which gives them a total return less than that of a farm labourer, knowing, too, that their economic position is liable to worsen further. While little harm is being done to the nation's resources there is little point in inducing them to give up farming, but they cannot reasonably expect to receive any special long-term financial support from the rest of the community.

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APPENDIX A

DEFINITIONS AND NOTES ON TERMS USED

DEFINITIONS

The terminology is that used in "Farm Incomes in England and Wales".

Acreage	Except where otherwise stated acreage of farms is the total acreage of crops, grass and rough grazing.
Adjusted Acreage	The adjusted acreage of a farm is the acreage under crops and grass, to which is added a further area equal to the value of the rough grazings expressed in terms of average pasture. Thus, if a farm consists of 50 acres under crops and grass and a further 100 acres of rough grazing which is considered to be equivalent to twenty acres of average pasture, the adjusted acreage of the farm is 70 acres. The conversion factor varies from locality to locality.
Capital	*Landlord's Capital.* The investment in the land, farm buildings etc. This is largely fixed capital in the normal economic sense of the term. *Tenant's Capital.* The investment in livestock, crops, machinery and other equipment, required for the day to day operations of the farm (operating capital). Tenant's capital contains some elements of the fixed capital in a farm (major items of equipment) and also circulating capital.
Costs (overhead and variable)	Overhead costs are those which are basic to the farm in the sense that they are unavoidable. Variable costs are the outlays which the farmer can influence by changes in the scale and nature of his operations. In this report the following division has been made: *Overhead costs.* Rent, the value of the farmer's, his wife's, and unpaid family labour, machinery depreciation, interest on capital, sundries. *Variable costs.* Foods, manures, seeds, paid labour, contract charges, fuel, machinery repairs.
Economic Efficiency	This term is used to describe the ratio of the value of the product (outputs) to that of costs (inputs), measured in cash terms (see note 1).
Expenditure	Farm expenditure includes, in addition to cash payments a depreciation charge for machinery and vehicles, the rental value of the farm in the case of owner-occupiers, payments in kind (board, lodging, cottages and perquisites) and charges for unpaid work by members of the farmer's family. It does *not* include any charge for the work performed by the farmer or his wife. Nor does it include any payment of interest, either on capital invested or on the business, or on borrowed capital. Expenditure of a capital nature has been excluded.
Holdings	Where precision is required, e.g. in giving numbers of farms in a particular size group, the term "holdings" is used, following the practice of the Agricultural Census. For the purposes of the report the term "numbers of holdings" may be regarded as broadly synonymous with the number of farms (see note 2).
Income	Income means net income on which the tenant has to be paid, i.e., the balance of total revenue over total expenditure, adjusted for the difference between opening and closing valuations for crops and livestock. No charge has been made for the labour, physical or managerial, by the farmer or his wife before arriving at net income, nor for the use of the capital provided by the farmer.

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Input	The term input is used to mean the monetary value of all the resources used on the farm, including land, labour, feedingstuffs, fertilisers, machinery usage etc.
Intensification	This expression is used loosely to mean the process whereby higher outputs per acre are achieved by using more inputs.
Labour	*Paid Labour* is made up as follows: (a) regular and casual labour employed directly by the farmer; (b) manual work on a contract basis by workers not directly employed by the farmer; (c) cost of family labour other than that of the farmer or his wife, whether paid or unpaid; (d) the farmer's share of insurance contributions; (e) the value of payments in kind and the cost of salaried staff. *Farmer's own labour and that of his wife*. This is estimated by costing the proportion of the year worked (according to the farmer's own statement) at the standard rates for agricultural workers. No allowance corresponding to overtime payments to paid staff is made and no special allowance is made for the managerial content of the farmer's labour. *Total labour* is the sum of paid labour and the value of the farmer's own labour and that of his wife.
Land quality	The terms "poor land" and "good land" are not intended to convey any precise differences in fertility. As used in the report, they are convenient terms to describe high and low-yielding land under existing methods of cultivation, etc. The distinction is usually made on a rental value basis.
Output	The term output is used to describe the product of agricultural operations expressed in monetary terms. Where precision is required the terms gross output, net output, standard output and production are used. (See also note 3). These terms are defined as follows: *Gross output* is equal to farm revenue, less certain items of non-farming income (cottage rents, farmhouse residential rent or rental value, farm stores used in the farmhouse, private share of car expenses, etc.) and also less livestock and livestock products bought from other farms. The final figure is adjusted for the difference between opening and closing valuations. *Net output* is the output due only to agricultural operations on the farm itself. Purchases of seeds and feedingstuffs, which are the input of other farms, are deducted from the gross to arrive at the net output. *Production* corresponds very closely with gross output but omits direct grants* paid to the farmer in cash, such as ploughing up grants, hill cattle and hill sheep subsidies. *Standard output*. (Appendix G only). The standard output of a farm is the sum of the standard outputs of the enterprises producing products for sale. The acreage of sale crops, numbers of sale livestock or quantities of livestock sale products are multiplied by average farm-gate sale values of these units to arrive at standard output.
Scale of Enterprise	This is the size of the farm business, as opposed to the physical size of the farm in acres.
Size of Farm	This term is specifically restricted to the physical extent of the farm measured in acres: we have used the terms "very small", "small",

*Direct grants are those paid to the farmer in cash. They include such items as ploughing-up grants, hill cattle and hill sheep subsidies, marginal production grants and calf subsidies. They do not include 'end product' subsidies (i.e. those on eggs, farm cattle), deficiency payments, the fertilizer subsidy or any capital grants made to farms.

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"medium", "large" and "very large" to include farms in the following size ranges:

Very small farms	.	.	20–50 acres
Small farms	.	.	20–100 acres
Medium-sized farms	.	.	100–300 acres
Large farms	.	.	300–1000 acres
Very large farms	.	.	over 1000 acres

Farms of 0–20 acres, are for the most part either specialist or part-time holdings and have been excluded from the report except in statistics of farm size.

Type of Farm Farms are classified according to the categories of the Farm Management Survey. The sample of farms in the Survey has been broadly divided into four types of farm (arable, dairying, livestock, and mixed) according to the predominant commodities produced. Farmers who are predominantly pig and poultry producers or market gardeners are grouped separately as specialist producers. The report does not include farms in specialist categories. (See also Note 4.)

NOTES

Note 1 *Economic efficiency.* The output/input ratio is a measure of the "average efficiency" over the whole range of inputs and outputs, not of the "marginal efficiency", i.e., the return to be expected from adding extra units of inputs at the level of output already reached. For the reasons given in the report however, it is considered that the lower average efficiency of small farms indicated by the ratio also indicates a lower marginal efficiency.

Note 2 *Holdings.* Census returns refer to holdings. There are however cases in which a number of holdings are managed together by one farmer, and to this extent the census figures provide an inaccurate estimate of the number of farms. These multiple holdings are not very common except in the below 20 acre group, and as these have been left out of this study, the inaccuracy in equating numbers of farms with numbers of holdings is probably small.

Note 3 *Gross and net output.* The value of gross and net output differs by the amount spent on seeds and feedingstuffs. Both quantities however, contain an element of profit (since they are basically measures of revenue) which may be attributed to the processing of purchased feedingstuffs. If net output per unit of input were used as the basis for comparisons of economic efficiency, the ratio obtained would be distorted, since the cost of feedingstuffs is excluded while the profit from processing them remains. Gross output, therefore, is used as the basis of comparisons between both types and sizes of farms.

Note 4 *Farm types.* The farms included in the Farm Management Survey are now grouped into forty-two type-of-farming areas and three specialist groups. The type-of-farming areas are areas within which environmental conditions are approximately uniform and where a distinct type of farming tends to predominate. They are grouped into nine type-of-farming sub-groups which are in turn arranged in five main groups (Dairying, Livestock, Mixed, Arable and Specialist). Since the basis of classification is in the first instance by type-of-farming area rather than by type of farm the samples are not narrowly confined to one type of farm. In a small number of cases farms departing radically from the predominant type have been excluded.

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APPENDIX B

ASSISTANCE FOR SMALL FARMERS

Note: *This Appendix consists of extracts from Cmd. 553, the Government White Paper giving the outline proposals for assistance to small farmers.*

Policy objectives

A main objective of the Government's agricultural production policy is to foster a steady improvement in the industry's competitive position. Many small farmers need to take special steps to adapt their methods, production and resources generally if their small farm businesses are to earn a satisfactory living for them in conditions of increasing competition. The more limited financial and other resources generally, available to them, as compared with larger farmers, make it particularly difficult for them to take these steps. But it is important that all such businesses that are fundamentally economic should have the encouragement and opportunity to achieve the higher standards of efficiency and of management that are required.

Good management in particular is a key to economic success on the small farm, as in farming generally. Many small farms are in practice earning good profits. In most case it is better management that distinguishes them from the rest. Even so, many small farms that are already reasonably well managed could adopt still better management and technical practices, particularly in regard to the improvement of grassland, with the object of creating the conditions in which they can become more competitive. In the Government's view what is now needed is a special drive to encourage the smaller farmers to take advantage of modern knowledge and practice, supported by the provision of initial working capital to make such a drive effective. Only in this way can many small farm businesses be enabled in practice to reach the higher level of earning power which is desirable if they are to be put on a sound footing for the future. This is the object of the new measures which the Government have decided to introduce. These will open up fresh opportunities for those small farmers who have the determination and initiative to take advantage of the assistance now offered and who accept the obligation to carry through the necessary improvements.

The Government have already announced that the existing Marginal Production Schemes are being discontinued. These schemes had their origin in the war-time need for maximum output, whereas the present need is for production that is more economic. The Government have decided, however, as a transitional measure to allow time for adjustment, to give assistance for a further limited period to a number of those who have benefited from marginal production assistance in the last few years but who will not be eligible for the new scheme of assistance for small farmers.

There are many farm businesses that are not capable of providing remunerative full-time employment on an average occupier. A considerable number of these are part-time only. To the extent, however, that non-viable farm businesses present a special problem, the Government have been studying this and will continue to do so. The Government must not, however, be expected to provide special financial assistance to help fundamentally uneconomic farm businesses to remain in being, although such businesses will continue to benefit from general agricultural subsidies.

Outline of the Government's proposals

There are two parts to the Government's proposals:

(i) *A small farmer scheme.* This will provide special help to small farm businesses that are economic in the sense that they are capable, with reasonable management, of giving remunerative full-time employment to the

average occupier. The essential basis for receiving aid under this scheme will be that the small farmer concerned will carry out, over a period of four to five years, an approved plan for the improvement of his farm business.

(ii) *A supplementary scheme.* This is an interim measure designed to help those small farmers eligible for the Small Farmer Scheme but for whom, for for one reason or another, farm business improvement plans are not immediately practicable, and to continue to give temporary assistance to some marginal producers who will not be eligible for the Small Farmer Scheme.

The small farmer scheme

The scheme is designed to help a range of small farm businesses. At the lower end it is intended to include those farm businesses capable of providing, for an average occupier with reasonable management, remunerative fulltime employment, i.e. capable of yielding a net income broadly equivalent to the average earnings of a skilled agricultural worker. There will be a combination of two tests to decide who is a small farmer for the purposes of this scheme: both will relate to the farm business. To be eligible the farm business must have not less than 20 and not more than 100 acres of crops and grass (other than rough grazing). But acreage by itself is not a sufficient criterion. The acreage test will be coupled, therefore, with a test of the size of the farm business. The Government have examined possible alternative measures of the size of a farm business, such as net income, gross output, or the amount of capital employed in the business. They have concluded that for a scheme of this kind the most appropriate measure would be the standard labour requirement for the cropping and stocking of a farm. This measure takes account of all the productive processes on a farm; it can be applied uniformly throughout the country and is one of the yardsticks used for farm management advisory purposes. To qualify for assistance under the Small Farmer Scheme, the farm business must be judged capable of reaching standard labour requirements of at least 275 standard man-days after completion of the proposed farm business plan. It will be assumed that farm businesses with existing standard labour requirements of not less than 250 standard man-days are capable of doing this; those below this figure will need to be considered in the light of the plans put forward. Farm businesses with standard labour requirements, based on existing cropping and stocking, of more than 450 standard man-days will not be eligible for assistance under the Small Farmer Scheme.

Small farmers, so defined, who wish to take advantage of the Scheme will have to put forward plans for the improvement of their farm businesses. A plan will need to cover a period of from three to five years. Farm business plans will be subject to the approval of the Agricultural Departments, after consideration by their technical advisory staff.

Small farmers, as defined, will be eligible under the scheme for two kinds of special grant. These will be a farm business grant, which will be payable to all those carrying out an approved farm business plan, and field husbandry grants which will be payable in respect of particular groups of field operations included in the plan.

The farm business grant is intended as a contribution towards the expense incurred by the applicant on items, such as purchase of stock or equipment, which are an integral part of his farm business plan but are not covered by a field husbandry grant. The farm business grant will therefore be at a standard rate which will be a total of £6 per acre of crops and grass (excluding rough grazing) in the farm business, but subject to a maximum of £300 per farm business. Subject to satisfactory progress with the approved farm business plan, payment of the farm business grant will be made in four equal instalments spread over a period of three years.

The field husbandry grant will be payable, at standard rates, primarily for the improvement of land under grass, including ditching required to make such improvement effective, but also for any minor reclamation work essential for the fulfilment of the farm business plan.

The total assistance payable, by way of field husbandry and farm business grants, under the Small Farmer Scheme will be limited to £1000 in respect of any farm business plan.

The supplementary scheme

This will provide in the first place for interim assistance, on a simpler basis than under the Small Farmer Scheme, to small farmers for whom approved farm business plans are not immediately practicable, e.g. because they themselves are not ready to embark on such plans or because the Agricultural Departments cannot yet handle their applications.

Secondly, the scheme will be used to provide temporary assistance, for a period of three years, for the purpose of easing the position of some of those farmers who have been benefiting under the existing Marginal Production Schemes but who will not be eligible for the Small Farmer Scheme.

Numbers of farmers affected by the new schemes

Although there are over 500 000 agricultural holdings in the United Kingdom, a large number of these are part-time or spare-time holdings, while others are not separate farms. It is estimated that the number of full-time farm businesses in the United Kingdom is at present not much more than 300 000. More than two-thirds of the full-time farmers either have more than 100 acres of crops and grass or are likely to be above the size of business qualification for the Small Farmer Scheme. It is expected that most of the remainder, or something like 65 000 full-time farmers, will be eligible for assistance under the Small Farmer Scheme or, as an alternative, the Supplementary Scheme. In addition, about 25 000 former recipients of marginal assistance are expected to be eligible only for the Supplementary Scheme (or for the revised Marginal Agricultural Production Scheme in Scotland), making a total of about 90 000 farm businesses that may benefit under one or other of the new schemes.

Cost of the new schemes

It is estimated that in the first full year of their operation the cost of the new schemes may be of the order of £6 millions for the Small Farmer Scheme and £3 millions for the Supplementary Scheme (and the revised Marginal Agricultural Production Scheme in Scotland). Against this total of about £9 millions has to be offset the current annual cost, about £3 millions, of the existing Marginal Production Schemes which are being discontinued. This leaves a net additional expenditure of about £6 millions which will be taken into account at the 1959 Annual Review as part of the guarantees and production grants to the industry. There will also be consequential additional expenditure under existing grant and subsidy schemes as more advantage is taken of these. While the full extent of this cannot be estimated, it is likely that the improved husbandry practices resulting from the new schemes will involve additional expenditure of some £3–£4 millions a year under the existing production grant schemes for ploughing, fertilizers and lime.

These estimates are based on the assumptions that farm business plans for some 25 000 small farmers in the United Kingdom may be approved in the first full year of operation of the Small Farmer Scheme and that although the amount of grant will vary from farm to farm, the average amount per farm, taking farm business and field husbandry grants together, will be of the order of £240 in the first year and about £700 over the three to five-year period for which each improvement scheme will run.

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APPENDIX C

RESOURCE USE—WELSH DATA

General

The inputs of some 400 Welsh farms have been analysed per £100 of production of output for the year 1956/57. The farms are those included in the Welsh Farm Management Survey, undertaken by the Department of Agricultural Economics, University College of Wales, Aberystwyth. In the analysis, inputs have been divided into the following categories:

Rent, Total Labour, Power and Contract, Purchased Foods, Manures, Sundries, Land Used, Capital Employed (separated into Livestock and Machinery). A notional item for 5 per cent interest on the tenant's capital employed is also added.

Unfortunately the grouping of the data is not ideal for this analysis, for only the dairy farm groups under 100 acres have been sub-divided into those over and under 50 acres; this was not done for the other types because there were not sufficient farms in the sample to justify it.

The sample

The make-up of the sample is shown in Table C I below:

TABLE C I
Welsh sample 1956-57

Type group			Size group—adjusted acres	Number	Average size—adjusted acres
Dairy (better land)	..	..	0– 49	29	39
			50– 99	26	74
			100–199	24	135
			200+	8	280
(poor land)	..	..	0– 49	20	35
			50– 99	23	72
			100–199	13	130
			200+	3	210
Mixed (better land)	..	..	0– 99	19	60
			100–199	14	140
			200+	10	300
(poor land)	..	..	0– 99	22	73
			100–199	26	150
			200+	13	260
Livestock rearing (better land)	..		0– 99	20	70
			100–199	22	150
			200+	16	290
(poor land)	..	..	0– 99	24	69
			100–199	33	140
			200+	30	360
All types	..	..	0– 49*	49	38
			50– 99*	49	73
			0– 99	183	62
			100–199	132	140
			200+	86	320

*Dairy Farms only.

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Resource use and type of farm

Table C II below shows the analysis of resource use per £100 of production grouped by size of farm.

TABLE C II
Inputs per £100 production—Welsh sample 1956-57

Inputs	Dairy farms only		All farms in the sample		
	0–49	50–99	0–99	100–199	200 and over
	£	£	£	£	£
Rent	4·3	4·4	4·8	6·0	6·5
Total labour	29	27	33	33	29
Power and contract ..	15	17	17	17	14
Purchased foods ..	39	36	34	26	22
Manures	3·4	4·5	4·1	5·1	6·3
5% interest on capital	3·9	4·4	4·8	5·6	6·3
Sundries	8·1	8·9	8·8	9·3	9·6
Total	**103**	**102**	**106**	**102**	**97**
Tenants' capital					
(a) Livestock	45	49	57	70	81
(b) Machinery	29	32	33	36	36
Total (including miscellaneous items)	77	88	97	113	126
Land used (acres) ..	1·6	2·5	2·7	4·3	5·9

The table shows the following points:

(a) The contribution of feedingstuffs to output declines rapidly as size of farm increases (£34 per £100 of production for farms under 100 acres to £22 for farms over 200 acres).

(b) The amount spent on manure for every £100 worth of production shows a steady increase with size of farm. The larger farms spent over half as much again as the smaller farms per unit of production.

(c) Total labour, power and contract, and sundries remain roughly constant in their contribution to output over the range of farm sizes in the sample. Rent, on the other hand, shows a slight increase with size.

(d) While the amount of land used per unit of production increases rapidly with increasing size of farm, the small farm appears to require considerably less capital to produce a unit of production than does the larger. The increased capital content of output in the larger farm is partly due to a slight increase in the use of machinery, but mainly to increased capital held in livestock. Small farms tend to concentrate on quick-return products (e.g. poultry and milk) while large farms usually have a very considerable part of their capital locked up in long-period turnover products (e.g. beef cattle and sheep).

Comparisons of farms grouped purely on an acreage basis such as are made in and the following table, mask the complications that arise from a change in the composition of the types of farms within each group. The small acreage groups include a relatively higher proportion of factor intensive farms, and the large acreage group a relatively larger proportion of poor land extensive farms. The overall effect of this is however to *reduce* the differences between the various size groups in inputs per £100 of production; in spite of this, however, the trend is easily seen in the tables in which all types of farm on the sample are grouped together.

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The general inference from Table C II is that the total value of inputs required to produce £100 of production falls with increasing size of farm (from £106 for farms under 100 acres to £97 for farms above 200 acres). When interest on capital and a charge for the farmer's own labour is included, the average profitability. As the definition of production excludes direct grants and subsidies, the actual profitability so far as the farmer is concerned is rather higher. If the present level of grants is assumed, the average break-even acreage over the whole sample at which the total input equals the gross output is about 150 acres.

Resource use per unit area

The same sample of 400 farms can also be used to show the trends in use of resources per unit area. In this analysis the resource categories are the same as in Table C II, except that labour is divided into three sub-categories; paid, unpaid, and farmer-and-wife labour. The results are shown in Table C III.

TABLE C III
Inputs per acre—Welsh sample 1956-57

| | Size Groups (adjusted acres) | | | | |
| | Dairy farms only | | All farms in the sample | | |
Inputs	0–49	50–99	0–99	100–199	200 and over
	£	£	£	£	£
Rent	2·7	1·9	1·8	1·4	1·1
Power and contract	9·0	6·8	6·3	4·0	2·8
Purchased foods	24	14	12	5·9	3·7
Manures	1·2	1·5	1·5	1·2	1·1
5% interest on capital ..	2·4	1·8	1·8	1·6	1·4
Sundries	4·9	3·6	3·2	2·2	1·6
Labour					
(a) Paid	1·9	2·5	2·3	2·6	2·8
(b) Unpaid	3·6	2·6	2·4	1·9	0·8
(c) Farmer and wife ..	12	5·9	7·3	3·1	1·3
Total labour	17	11	12	7·6	4·9
Total inputs	62	41	39	24	16
Total production	62	40	37	23	17

In this analysis, the "scale effect" noted in the analysis of inputs per unit of production is combined with an effect due to the decreasing intensity of farming which accompanies increasing size; for this reason both the total input per acre and each item of input fall off markedly as size increases. The value of inputs per acre for dairy farms of up to 50 acres is nearly four times that for all farms in the survey of over 200 acres. This decrease in inputs per acre is, however, in marked contrast to the breakdown of the labour input. While total labour falls with increasing area by about the same amount as does total input, the labour of the farmer and his wife per acre falls by a very much greater amount over the range of size groups. At the same time, the amount of paid labour per acre increases slightly with acreage.

A comparison of Table C III with Table C II shows some interesting results. Although rent, expenditure on manure, and interest on capital all decrease per acre as the acreage of the farm increases, they nevertheless increase as a proportion of total input. On the other hand, although the input of purchased feedingstuffs falls very rapidly as the size of farm increases, it falls much more slowly per unit of production. Similarly, although total labour input falls from approximately £12 per acre for

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all farms under 100 acres to £5 for those over 200 acres, almost all of this is accounted for by the higher level of buildings expenditure on the smaller farms.

The relation of resource use to type-of-farming

The basic data given above have also been analysed with respect to type of farming. The Welsh sample contains no arable farms, so the comparison is limited to dairy, mixed and livestock rearing enterprises. To avoid effects due to differences in quality of land the comparison is further limited to the better land farms. The same trends, however, appear if poor land is included as well.

The input of resources per £100 of production by type of farm is listed (Table C IV). In order to simplify the table, figures for only the smallest and the largest size groups in each category are given.

TABLE C IV

Inputs for £100 of production by type of farming

Welsh sample 1956–57

Inputs	Type of farming					
	Dairy (better land)		Mixed (better land)		Livestock rearing (better land)	
	0–49 acres	200 acres and over	0–99 acres	200 acres and over	0–99 acres	200 acres and over
	£	£	£	£	£	£
Rent ..	4·3	6·4	5·1	6·5	7·0	8·0
Total labour ..	23	25	27	26	45	31
Power and contract	14	17	21	16	22	18
Purchased feeds ..	42	25	36	16	12	12
Manures ..	2·9	7·4	3·6	6·5	5·8	7·1
5⅝% interest on capital	5·1	4·7	5·3	5·5	7·5	7·2
Sundries ..	7·1	10	8·0	9·0	10·5	10
Total ..	98	97	101	97	116	94
Capital						
(a) Livestock ..	42	55	55	37	90	92
(b) Machinery ..	28	33	38	38	49	37
Total (including miscellaneous items) ..	73	100	93	100	150	140
Land use (adjusted acres) ..	1·3	3·2	2·0	3·0	4·4	5·0

The following inferences may be drawn:

(a) Livestock rearing farms show the greatest variation in profitability between the small and large enterprises. The small show the largest negative profitability (£116 of inputs to obtain £100 of production), and the large the greatest profitability (£94 of inputs to obtain £100 of production). There is a much smaller difference in these size groups for both dairy and mixed farms.

(b) The labour content of production increases from dairying to mixed to livestock farms; again the difference between the size groups in the livestock rearing group is much greater than the differences in either dairy or mixed farms.

(c) The contribution of feedingstuffs varies most from dairying to mixed to livestock farms, the greatest differences between the small and large size groups being found in the dairying category.

(d) The capital involved per unit of output increases from dairying to mixed to livestock farms.

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The relation of resource use to quality of land

By contrasting inputs for the same type of farming on poor and better land the influence of quality of land on resource use may be found. Table C V below shows, for each type group, the inputs per £100 of production averaged over all farms of the type group. The classification into "better" and "poor" land is arbitrary.

TABLE C V

Inputs per £100 production by quality of land

Welsh sample 1956-57

Inputs		Dairy farms		Mixed farms		Livestock rearing farms	
		Better land	Poor land	Better land	Poor land	Better land	Poor land
		£	£	£	£	£	£
Rent	.. .. ..	5·2	4·8	5·7	5·0	8·1	6·1
Total labour	.. ..	23	34	27	40	35	44
Power and contract	..	16	18	18	18	19	20
Purchased feeds	..	35	27	29	25	14	20
Manures	.. ..	4·8	5·1	5·3	4·6	6·8	4·8
5 % interest on capital	..	4·3	5·0	5·1	5·9	7·4	8·0
Sundries	.. ..	8·7	9·5	8·7	8·7	10·8	10·1
Total	.. ..	97	103	97	107	101	111
Capital							
(a) Livestock	..	48	56	59	78	94	118
(b) Machinery	..	32	36	35	34	42	36
Total (including miscellaneous items		86	100	100	120	150	160
Land unit (adjusted acres)	..	2·3	3·5	2·8	6·2	5·0	11

The following inferences may be drawn:

(a) Poor land farms are below the break-even point (i.e. more than £100 of inputs are required to produce £100 of production), irrespective of type of enterprise; the poor land livestock rearing group shows the largest negative profitability.

(b) The value of feedingstuffs as a contribution to output rises from the better land to poor land for livestock farms but falls for the other two groups. This appears contrary to what might be expected. For the dairy and mixed farms the reason lies in the composition of their total production, the better land farms relying more on relatively larger numbers of pigs and poultry and high-yielding dairy cows, all of which are heavy consumers of purchased feedingstuffs, and the poor-land farms having relatively more sheep and beef cattle, which consume relatively small amounts of purchased feedingstuffs. On the livestock rearing farms this difference in the type of production on the better and poor land holdings is not important and the effect of the poorer quality of land is therefore shown in relatively higher feedingstuffs inputs.

(c) The amount of capital required to produce £100 of production is greater on poor land than on better land for each type of farming. This again is due to the differences in the total production of the various groups, the better land groups concentrating more on those enterprises which have a relatively rapid turnover.

(d) The poor land farms can achieve viability only at higher acreages than the better land farms. The productive potential of the land, as well as the superficial area of the farm, is a major factor in determining viability.

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Overhead and variable costs

Costs may be grouped into fixed and variable categories. The fixed or overhead costs are those which the farmer must regard as basic to his farm, while the variable costs, which depend on the scale and nature of his operations, can be influenced by decisions he makes. Whilst this division is necessarily somewhat arbitrary, the most satisfactory classification of the inputs listed above is:

    Overhead costs: rent, labour of farmer and wife and unpaid family labour, machinery depreciation, interest on capital, sundries.

    Variable costs: foods, manures, seeds, paid labour contract, fuel and repairs of machinery.

The way in which the relative amounts of overhead and variable costs vary with size type of farm and quality of land may be seen from Table C VI below.

TABLE C VI

Overheads and variable inputs per £100 gross output

Welsh sample 1956-57

	Size Groups (adjusted acres)				
	Dairy farms		All farms in the sample		
	0–49	50–99	0–99	100–199	200 and over
Dairy (better land)					
Overheads ..	44	39	42	33	35
Variable ..	55	59	57	62	59
Total ..	99	98	98	95	94
Dairy (poor land)					
Overheads ..	70	63	66	49	32
Variable ..	47	49	48	47	44
Total ..	117	112	114	96	76
Mixed (better land)					
Overheads ..	—	—	45	45	36
Variable ..	—	—	55	45	57
Total ..	—	—	100	90	93
Mixed (poor land)					
Overheads ..	—	—	63	58	45
Variable ..	—	—	51	51	44
Total ..	—	—	114	109	89
Livestock rearing (better land)					
Overheads ..	—	—	66	56	39
Variable ..	—	—	43	42	48
Total ..	—	—	109	98	87
Livestock rearing (poor land)					
Overheads ..	—	—	86	67	54
Variable ..	—	—	42	38	41
Total ..	—	—	128	105	95
All farms					
Overheads ..	55	50	59	53	44
Variable ..	52	54	50	47	48
Total ..	107	104	109	100	92

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These results show that:

(a) There is no definite pattern to the variable inputs per £100 output, as they change with size of farm, the contribution of overhead costs to output falls steadily with increasing size of farm, irrespective of type of farm and quality of land.

(b) In general, overhead costs per unit of output fall more steeply with increasing size for poor land farms than for better land farms. The amount of overhead costs per unit of output is on the whole higher for poor land farms, particularly for those on small acreages, owing to the relatively low outputs achieved on them.

(c) The contribution of overhead costs to output varies slightly with type of farm, tending to be less with dairy and mixed farms than with livestock farms. These differences are more pronounced in the smaller size groups than in the larger. In any case these differences are considerably less than those due to differences in land quality.

(d) Where the farms in the sample are below the break-even point for outputs and inputs calculated on the basis used in this Appendix, this appears to be very largely due to a high level of overhead costs. The proportion of input due to variable costs, is much more constant although it shows some tendency to decline slightly with increasing size of farm. The importance of overhead costs in determining the viability of the enterprise may be illustrated by the small livestock rearing farms on poor land (the worst case). Here £128 of input are required to produce £100 of gross output, and this is made up of £66 in fixed costs and £42 in variable costs. The latter figure is in fact slightly below the average of fixed costs for all farms of the sample, while the former is well above it.

Gross output as an index of viability

The preceding paragraphs show the importance of overhead costs in determining the viability of the farm enterprise, and the relation between the size of farm and the level at which these overhead costs contribute to output. It is also possible to group fixed and variable inputs according to the level of gross outputs (Table C VII).

TABLE C VII
Inputs per £100 gross output by level of output
Welsh sample 1956-57

	Inputs per £100 gross output		
Gross output	Overhead costs	Variable costs	Total costs
£	£	£	£
0–1000	100	40	140
1000–1500	77	43	120
1500–2000	65	46	111
2000–2500	55	47	102
2500–3000	51	48	99
3000–4000	45	51	96
4000–5000	39	53	92
5000 and over	34	56	90

The table indicates that, for the sample as a whole, the break-even point is about £2500 of gross output. Below this level of output total costs per £100 of gross output increase above the £100 mark, and above it, total costs per £100 gross output diminish steadily. Both fixed and variable costs show a definite pattern when grouped by gross

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output, the former declining rapidly with increasing output and the latter rising with it, though less steeply. Although some of these differences in the level of inputs per £100 gross output may be due to the effect of "luck" in the results of the individual farms (and this is bound to occur when the results of only 1 year are considered), it is most unlikely that more than a very small fraction of these differences can in fact be accounted for in this way.

This indicates clearly that the increasing viability of farms as their gross output rises is mainly attributable to the decline in overhead costs. The rise in variable costs with gross output can be accounted for by considering the effect of intensity. The farms with relatively large outputs fall into two separate groups: those which have a high output because they have a large acreage and those which have a small acreage but are very intensively managed. In the latter group of farms, a high output per acre which must be achieved in order to obtain a large total output, necessitates the heavy use of purchased feeding stuffs. It is these farms which (for the whole sample) cause the variable costs per £100 of gross output to increase slightly as the level of total input increases. The farms which achieve larger outputs because of their relatively large acreage do not need to use great quantities of purchased feedingstuffs, but they do have the highest inputs of land for every £100 of output. As the rents of farms in this country have been low, whilst other costs have tended to increase, these farms have been able to achieve the lowest total inputs in money terms for every £100 of output. Moreover, they are the farms best able to take advantage of the opportunities for spreading their overheads over a large output.

Influences of type of farming and quality of land

Table C VII is for all farms of the Welsh sample. If the type groups are considered separately the same general relations emerge. As would be expected, the break-even point is slightly affected by type of farming and quality of land: the variations, however, are comparatively small. The slight upward trend of variable costs and the much greater downward trend of overhead costs appear in all type groups.

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RESOURCE USE—EAST ANGLIAN DATA

General

In Table D I below costs for various size groups of farms in East Anglia have been expressed as percentages of gross output. 240 upland arable farms are included in the sample.

TABLE D I

Inputs per £100 gross output

East Anglian sample (average of years 1954-5 and 1955-6)

		Size Groups (acres)				
		20-50	50-100	100-150	150-300	300+
Average size	..	35	75	121·5	213·5	495
Gross output/acre	..	50	52	42	43	39
		£	£	£	£	£
Inputs						
Paid labour	..	14·0	20·0	21·0	22·0	25·0
Machinery depreciation	..	4·2	4·8	6·0	5·8	5·2
Machinery repairs	..	2·4	2·8	3·7	3·6	4·7
Fuel	..	4·4	4·6	5·0	4·2	4·6
Contract	..	4·0	3·3	3·3	2·5	2·1
Fertilizers	..	3·8	4·6	5·2	5·8	6·0
Seed	..	2·8	3·4	4·3	4·0	4·3
Feed	..	30·0	24·0	19·0	16·0	15·0
Rent	..	3·6	3·6	4·7	3·9	4·3
Miscellaneous	..	6·5	6·5	6·7	5·9	6·3
Total paid costs	..	76	78	79	77	78
Farmer's manual labour	..	15	6·6	5·0	2·3	0·4
Interest on tenants capital	..	4·6	4·4	4·7	4·6	4·6
Total	..	96	89	89	84	83
Total labour	..	29	27	26	24	25
Machinery costs	..	15	16	18	16	17
Acres of land	..	2·0	1·9	2·4	2·3	2·6

The composition of gross output varies from small to large farms; the proportion of livestock products is very much greater on small farms than on large and this is reflected in the pattern of costs. For instance, on small farms 64 per cent of gross output came from livestock, whereas in the largest group farms in the sample it was under 40 per cent. There are major differences between small and large farms; cost changes from £30 to £15 per acre, paid labour £14 to £25 per acre, farmer's unpaid labour £15 to £0·6 per acre, fertilizers £3·8 to £6·9 per acre. The difference in the feedingstuffs has been accounted for by the different pattern of output. If the paid costs per £100 of gross output are examined, it is found that there is very little difference between small and large farms in total, and so the major difference is the cost of the farmer's manual labour (Table D I). Machinery costs per £100 of gross output are not very different on small and large farms, despite the fact that the latter should have considerable economies of scale in the use of larger implements such as tractors, combines, etc. The small farmer tends to buy second-hand equipment at fairly low prices and does not require the equipment for such sustained periods of heavy work as the large farmer so that the rate of depreciation is smaller.

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Overhead and variable costs

The relation between overhead and variable costs with size of farms is given in Table D II and shows clearly the difference between small and large farms.

TABLE D II

Overhead and variable inputs per £100 gross output
East Anglian sample (average of years 1954-5 and 1955-6)

			Size Groups (acres)		
Inputs	20–50	50–100	100–150	150–300	300+
	£	£	£	£	£
Overheads					
Rent	3·6	3·6	4·7	3·9	4·3
Farmer's labour..	15·0	6·9	6·5	2·3	0·6
Miscellaneous ..	6·5	6·5	6·7	5·9	6·3
Depreciation ..	4·2	4·8	4·6	6·2	5·2
Interest	4·6	4·4	4·7	4·6	4·4
Sub-total	34	26	27	23	21
Variables					
Food	30·0	24·0	19·0	19·0	16·0
Fertilizers ..	3·8	4·6	5·2	5·8	6·9
Seed	2·8	3·4	4·3	4·0	4·3
Labour	14·0	20·0	21·0	22·0	25·0
Contract	4·4	3·5	3·0	2·5	2·1
Fuel	4·4	4·7	5·0	4·2	4·6
Repairs	2·4	2·8	3·7	3·6	3·0
Sub-total	62	63	62	62	62
Grand total	95	89	89	84	83

Variable costs per £100 output differ with acreage but fixed costs per £100 of output are very much greater on small farms than on large, and here the farmer's own labour is the outstanding difference. The large farms use more paid labour per £100 output, and this is included in variable costs, and so the composition of output varies with the size of farm, it is difficult to compare the efficiency with which small and large farmers use their variable resources. It still remains true that the small farmer has insufficient business to cover adequately his fixed costs, particularly his own labour.

TABLE D III

Distribution of farm incomes by size and type of farm
East Anglian sample* (average of years 1953-55)

	Upland farms	Fen farms
	No.	No.
20–50 acres		
Farm income under £500	24	8
Farm income over £500	12	21
	36	29
50–100 acres		
Farm income under £500	19	3
Farm income over £500	39	17
	58	20

This in turn means that he is not nearly so likely to obtain a reasonable income from his farm (Table D III), where two-thirds of the farms under 50 acres in the upland group fail to obtain a farm income of £500, whereas two-thirds of those between 50 and 100 acres do so. To gain some idea of the business required, Table D IV shows the relation between farm size and net output to produce an income of £500; the larger farm requires a lower output per acre because of wider spread of fixed costs.

TABLE D IV

Net output required to produce £500 farm income
East Anglian sample* (average of years 1952-3 and 1954-5)

Farm size (acres)	Upland (94 farms)		Fen (49 farms)	
	Total	per acre	Total	per acre
	£	£	£	£
20	1200	58	1000	51
30	1300	44	1300	42
40	1500	37	1500	38
50	1700	33	1700	35
60	1800	30	2000	33
70	2000	28	2200	32
80	2200	27	2500	31
90	2300	25	2700	30
100	2500	25	2900	30

Notes

The multiple regression equations are:

Upland: $y = 144 \cdot 8 - 7 \cdot 03 x_1 + 0 \cdot 43 x_2$
Fenland: $y = 325 \cdot 3 - 7 \cdot 79 x_1 + 0 \cdot 32 x_2$
$y =$ farm income $x_1 =$ size (acres) $x_2 =$ net output.

The coefficients are significant at the 1 per cent level.

Net Output = Sales (adjusted for valuation changes) less purchases of livestock, seeds and feedingstuffs.

*The sample in Tables D III and D IV is not the same as that for Tables D I and D II above. It contains only 94 upland farms, not 240, and 49 fen farms not included in the original sample.

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APPENDIX E

RELATIONSHIP BETWEEN SIZE OF FARM AND ECONOMY IN SCOTLAND

Note: *This Appendix is compiled from extracts from "Scottish Agricultural Economics" Vol. VIII (The Small Farm in Scotland).*

SIZE PATTERN OF FARMS IN SCOTLAND

By the term farm we mean a commercial enterprise which provides a full-time occupation, or is the primary source of income for the farmer. There is thus not only an upper limit but also a lower limit to the size of the small farm. Farms below this lower limit, which cannot begin to provide more than part-time employment and a partial livelihood, are more correctly described as "part-time farms" rather than as "small farms". This distinction is particularly important in the Highlands because the great majority of the crofts must be regarded as part-time farms providing a certain amount of subsistence in the way of milk, eggs and potatoes together with a small cash return from sales of sheep and cattle. But the working of the croft is not generally a full-time agricultural enterprise and the crofter has to supplement his income from some other source.

The lower limit of size of the small farm may, therefore, be said to be determined by whether it provides sufficient work to employ a man for the greater part of normal working hours; this limit has been taken as being 1800 hours of work per annum. Any upper limit must, inevitably, be arbitrary since there is no generally accepted standard, but for the present purpose, it has been taken as a farm of not more than 100 acres of crops and grass, employing not more than one regular full-time worker in addition to the farmer. (Turnover would probably be a better measure for size than acreage but is known only for the relatively small number of farms for which accounts are available.) On this definition small farms include the majority of the family farms as well as some employing one hired worker. For present purpose all farms over 100 acres or employing more than one regular worker are described as medium and large farms.

TABLE E I
Number of small, medium and large and part-time farms

		Small farms		Medium and large farms		Part-time farms		Total
		'000	%	'000	%	'000	%	'000
Scotland	.. ..	12·8	22	19·4	33	25·8	45	58·0
North East	..	5·8	35	5·5	33	5·4	32	17·0
East Central	..	1·4	22	3·6	56	1·4	22	6·4
South East	..	0·7	18	2·3	59	0·9	23	3·9
South West	..	2·9	24	6·3	52	2·9	24	12·0
Highlands	..	2·0	11	1·7	9	15·2	80	19·0

Of the 58 000 farm units in Scotland just over one-fifth are small farms, one-third are medium and large farms and 45 per cent are part-time. But south of a line running approximately from Oban to Aberdeen small farms account for 20 per cent of the total, larger farms for 60 per cent and part-time farms for only 20 per cent. While a large proportion of the part-time farms are in the Highlands (and would generally be

Distribution of small farms by type of farming

				Number	Per cent
Stock rearing	..	..	..	4 300	34
Stock rearing and feeding	..	..	2 600	20
Dairy	..	..	..	2 300	18
Arable	..	..	..	1 600	13
Hill sheep	..	..	..	800	6
Intensive types	..	..	..	1 200	9
All full-time				12 800	

described as crofts) nearly one-half of the small farms are in the North-East region—especially in Aberdeenshire, Banffshire and Orkney—and many of them are upland stock rearing farms. More localized concentration of small farms, of rather mixed types, occur in some industrial areas of central Scotland—in parts of the counties of Lanark, Stirling and West Lothian—and also in some upland dairy farming areas of the South West. Apart from these areas which account for three-quarters of the small farms, the remainder are widely scattered throughout Scotland; most of them are in the foothill areas except south and east of Edinburgh where there are very few small farms other than of intensive types.

OUTPUT OF SCOTTISH FARMS

So much for the numbers and geographical distribution of small farms. It is also important to know how Scotland's agricultural land is distributed between different sizes of farm and their relative contributions to agricultural output. There are no firm figures on this subject but it is possible to make the estimates shown in Table E III which, while subject to some margin of error, give the broad general picture. The small farms account for one-seventh of the acreage of crops and grass, the medium and large farms for four-fifths and the part-time farms for less than one-twentieth. In terms of gross output the small farms produce about one-sixth, the larger farms three-quarters and the part-time farms about 7 per cent. The contribution of small farms varies, of course, from commodity to commodity. As might be expected their contribution is relatively great in pigs and eggs but is relatively small in sheep and cattle (despite the

TABLE E III
Approximate percentage distribution of acreage, output and labour force between small, medium and large and part-time farms

			Small farms	Medium and large farms	Part-time farms
Acreage (crops and grass)	..	..	14	82	4
Output					
Gross output	..	..	16	77	7
Crops (including horticulture)	..	14	83	3
Cattle	..	..	13	82	5
Sheep and wool	..	..	10	81	9
Pigs	..	..	28	62	10
Milk	..	..	14	82	4
Eggs and poultry	..	..	22	60	18
Labour					
Farm workers	..	..	10	88	2
Farmers and farm workers	..	21	65	14

importance of the latter on some of the smaller upland farms. It will be apparent from Tables E II and E III that small farms in Scotland do not concentrate on milk production to any marked extent, though those that do are mainly in the west of Scotland.

As regards labour the position is that the small farms have only one-tenth of the hired workers (including family workers), while the larger farms have nearly nine-tenths. On small farms, of course, farmers and their wives provide much of the labour; looking at the total available labour (including farmers and their wives) in terms of man equivalents, the rough picture is that small farms have one-fifth, larger farms two-thirds and part-time farms one-seventh.

Two general conclusions emerge from this analysis of the place of the small farm in Scottish agriculture. The first is that, in terms of number of farms (and of farmers) they are of considerable significance accounting for 22 per cent of the total. Even more numerous—45 per cent of the total—are the still smaller part-time farms but, for the reasons given earlier, these latter cannot really be regarded as commercial farms from which the occupier can expect to make a full-time livelihood. From the social point of view particularly in the Highlands, these part-time farmers are an important element in the agricultural community but this applies also to the small full-time farmers in the North East.

The second conclusion is that, in terms of the acreage of land worked, or the contribution to agricultural output and to labour employed, the importance of the small farm is not as great as is sometimes supposed. Only about one-sixth of group output of Scottish agriculture comes from small farms; if the part-time farms are added, the output of the two categories together is less than one-quarter while over three-quarters comes from the medium and large-sized farms. The small farms are relatively important producers of pigs and eggs (and this applies also to the part-time farms) but by far the larger part of the output of crops, milk, cattle and sheep comes from the medium and large-sized farms.

RESOURCE USE

A balanced picture of the place of small farms in Scottish agriculture requires some consideration of how they compare, in their use of national resources, with larger farms. The financial accounts made available to the Department of Agriculture for Scotland by the Agricultural Colleges provide data about this for small, medium and large farms of each type group. Rent is used as the measure of farm size and the group of small farms includes all farms of under £100 rent. To avoid distortions caused by the particular circumstances of individual years, and to put the figures on the same basis as some more detailed figures for small farms which will be examined later, the results for the three years 1952/53 to 1954/55 inclusive have been averaged.

Table E IV shows some idea of the difference in the scale of business on the farms which are being compared. The turnover of the small upland farms is about two-thirds of that of the lowland types and in general the medium-sized farms are about twice as big as this, while turnover on the large farms is about six times as great.

TABLE E IV

Size of business as measured by total revenue
(£ per farm)

	Hill sheep	Stock rearing	Stock rearing and feeding	Arable	Dairy
Small farms*	1 600	1 500	2 300	2 300	2 600
Medium farms*	3 200	4 500	5 700	6 700	6 500
Large farms*	7 200	11 000	16 000	17 000	14 000

*Respectively for £0–100, £100–250 and over £250 rent.

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The analysis thus allows comparisons to be made of farms differing widely in scale and organization whilst, as it covers over 800 farms representative of all the main types of farming in Scotland, it should give a realistic picture of conditions obtaining fairly generally on large and small farms.

Use of land

Efficiency in the use of land can be measured by the figures of output per acre in Table E V. "Output" in this article is virtually synonymous with "Gross Output"—the value of all livestock, livestock products, and crops produced, whether sold off the farm or used in the farmhouse or by the farm staff. An adjustment is made for changes in the inventory value of livestock on the farm. Output includes all subsidies paid as part of price but excludes those given as production grants. Thus deficiency payments are included but direct subsidies such as ploughing-up grants are excluded.

TABLE E V
Output per acre

		Hill sheep	Stock rearing	Stock rearing and feeding	Arable	Dairy
Small farms	..	13	20	36	37	46
Medium farms	..	15	24	39	50	47
Large farms	..	18	24	35	50	46

Note: The acreage figures are for crops and grass with an allowance for rough grazing.

These figures show that in general small farms produce rather less per acre than do larger farms, though in the dairy group, and in the stock rearing and feeding group, the difference between the smallest and the largest farms is negligible.* The situation in these two type of groups is a reflection of the importance of livestock enterprises (poultry on the small stock rearing and feeding farms) in which purchased feed plays a large part. It is only in these two groups that the heavier utilization of purchased feed by small farms (they buy up to twice as much per acre) seems really effective in raising output per acre. A point of importance which emerges, is that on all except hill sheep farms, the highest outputs per acre are achieved on medium-sized farms; this bears out the common assertion that up to a certain point the greater resources which go with farm size secure a clear return in output but that after that point it becomes increasingly difficult to maintain the increase in intensity of output over the larger acreages.

How are these higher outputs per acre achieved on the larger farms? In part it is a question of land quality, for the rents per acre—which are a reasonably good indicator for groups of farms, though perhaps unreliable nowadays for individual farms—indicate that the land is appreciably better on the larger farms, the biggest difference being found on the upland farms. More fertilizers are applied per acre on the bigger farms so that the better land quality is reinforced and there is a consequent double gain. (Some evidence of this is found in the lower level of feed purchases per acre on these farms though this arises also from the smaller proportionate importance of intensive livestock.) And other resources, too, are applied more intensively, with

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*The output per acre figures in Table E V are calculated on a very stringent adjusted acreage basis, using a very high ratio (e.g., in livestock rearing group, 10 acres of rough grazing were taken as equivalent to one acre of crops and grass. There was a relatively higher proportion of rough grazing on small farms. Hence the lower output per acre of small farms brought out in the table above is almost certainly due to other causes, the most important of these being quality of the land under crops and grass. It will be noted that the relation occurs even on arable farms where rough grazing acreages are not a complication.

peak of intensity in nearly every type of group on the medium-sized farms. It would seem that although the largest farms have the greatest advantage in land quality, the medium-sized farms can offset this by higher inputs per acre. Table E VI uses figures for stock rearing farms to illustrate these points, but the pattern it reveals is common to all except the hill sheep group where the largest farms have the advantage in every respect.

TABLE E VI

Stock rearing farms. Factors in land productivity

	Small farms	Medium farms	Large farms
Output per acre	2·0	2·4	2·4
Rent per acre	0·59	0·95	1·1
Fertilizer expense per acre ..	1·7	2·2	2·4
Total expenditure per acre ..	19·0	25·0	22·0
Feed purchases per acre ..	3·6	2·9	1·9

Use of labour

From the national point of view, if we are to make the best use of our land a high output per acre is desirable, provided it is not obtained by excessive use of purchased feed; and similarly the best use of our man-power demands the highest possible output per unit of labour employed. In comparisons between large and small farms a great deal hangs upon the value attached to the labour of the farmer and his wife, a large proportion of the value of labour input on small farms but relatively unimportant on large farms. If the value of this labour is omitted labour productivity is highest on small farms; but such a comparison by itself is misleading with farms of different sizes.

A better method is to enter the value of the farmer's own labour (and his wife's) at a constant figure (£500) irrespective of the size of farm. When this is done an indication is obtained of the return on all the labour employed, treating all farmers as equal.

TABLE E VII

Output per £100 labour input

	Hill sheep	Stock rearing	Stock rearing and feeding	Arable	Dairy
Small farms ..	240	230	330	320	310
Medium farms ..	240	280	380	380	380
Large farms ..	250	310	430	440	350

Table E VII shows that output per £100 labour input, calculated on this basis, is lowest on small farms and highest on the largest farms. This may be due in part to higher managerial ability on the large farms for matching the labour force to the work to be done and for providing with adequate machinery and power resources so that the labour input itself is kept to the minimum.

Measures of productivity

Output per unit of land and output per unit of labour measure only restricted aspects of the comparative efficiency of farms of different sizes; efficiency or inefficiency in the use of these might easily be offset by better utilization of other resources. Overall efficiency is best measured by output per £100 expenditure on all items of input and this is shown in Table E VIII. The main figures in this table allow a constant £500 for

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the farmer's own labour, but figures are also given in brackets which omit the value of the farmer's labour as an input. The fact that the main figures are below 100 in many cases indicates that without the direct subsidies these farms do not provide an income of £500 for the farmer.

It is clear from the main figure that when all inputs, including the farmer's own contribution, are taken into account per £100 input rises as size of farm increases. The difference is greater for the stock rearing group where large farms produce 20 per cent more per unit of input than do small farms. But the same pattern is evident everywhere except on hill sheep farms, with large farms showing at least a 10 per cent advantage in the output they secure from a given quantity of resources.

The figures in brackets show a different picture when the farmer's own labour input is left out of the reckoning. In most type groups the small farms are shown to make the best use of the other inputs, though their advantage is usually relatively slender. The critical factor in these measurements of relative efficiency is thus the farmer's own input, for its inclusion in the calculations changes the small farms from a position of advantage to one of disadvantage. In other words the weak point in the organization of the small farms is in the large amount of the farmer's own labour used to produce each unit of output. It is farmers that small farms are expensive, not in other resources.

TABLE E VIII

Output per £100 input
(including and excluding [in brackets] farmer's own input)

	Hill sheep	Stock rearing	Stock rearing and feeding	Arable	Dairy
Small farms	98 (130)	82 (110)	93 (110)	93 (110)	93 (110)
Medium farms	98 (120)	93 (95)	98 (114)	99 (110)	101 (110)
Large farms	92 (100)	101 (110)	104 (110)	105 (110)	109 (110)

This may be an inevitable result of small size of business which makes it impossible to realise the economies of scale, or it may be that there is not full-time employment for the farmer throughout the year, however busy he may be at peak periods. Either way, however, it is a problem which good management can do something to solve for if a farmer is to make the best income from a small farm it is essential that all his time should be used productively.

CONCLUSIONS

In comparison with large farms, small farms have on average lower outputs per acre, per unit of labour, and per unit of total many. Their land is generally of lower quality, and though they use other resources well they do not, because of their size, allow full utilization of the farmer's own labour input. In particular their small physical size makes it difficult for them to raise their turnover sufficiently to secure adequate incomes. They rely on subsidies no more and no less than do larger farms.

Very many small full-time farmers—about one half of them in fact—have been able to solve these problems. These are generally rather larger than average, but their stronger position is mainly due to their greater intensity and their higher efficiency, achieved in part because they are farmed by the more energetic and capable men.

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APPENDIX F

DATA ON CAPITAL

FIXED CAPITAL—LAND AND BUILDING

Table F I below shows the trend in price changes of farms per acre between 1918 and 1939. The information is taken from public notification of the results of farm auctions and therefore excludes prices paid in sales by private treaty. No distinction is made between sales with and without vacant possession.

TABLE F I
Farm prices 1918-1939 (England and Wales[1, 2])
(£'s per acre)

Years	Size Groups (acres)				
	5–49	50–99	100–149	150–200	300+
1918	34	30	33	24	18
1919	39	32	31	28	22
1920	40	37	31	28	23
1921	40	31	23	23	16
1922	50	28	23	20	20
1923	46	30	25	24	19
1924	46	26	28	25	23
1925	44	31	27	25	15
1926	50	30	25	18	15
1927	39	30	25	21	23
1928	43	24	25	21	16
1929	33	24	18	15	10
1930	38	26	17	15	12
1931	35	27	22	16	10
1932	41	26	14	15	10
1933	40	23	21	18	8
1934	48	31	19	18	19
1935	45	23	23	15	16
1936	43	30	24	19	15
1937	36	29	29	20	16
1938	47	31	24	17	12
1939	39	29	20	19	11

Table F II extends the information to include the years from 1937 to 1957, and separates the price paid per acre of farms sold with vacant possession from prices without vacant possession. It was collected in the same manner.

TENANTS' CAPITAL

Five sets of information are available. The first two are detailed estimates from particular areas (Wales and East Anglia) based on the Farm Management Survey sample for these regions. The third source is the Farm Management Survey national data on opening and closing valuations. An analysis of the make-up of tenants capital for the United Kingdom as a whole from 1937/38 to 1952/53, extended to cover the year 1956/57 provides another source, and finally an independent sample of 414 farm accounts in England and Wales has been provided by one of the major banks.

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TABLE F II
Sale price of farms in England and Wales[1,2]
(1937-1957)
(£'s per acre)

	Size Groups (acres)									
	5–49		50–100		100–149		150–300		300+	
Years	V.P.	W.V.P.	V.P.	W.V.P.	V.P.	W.V.P.	V.P.	W.V.P.	V.P.	W.V.P.
1937	40	34	35	30	29	25	22	20	14	29
1938	50	39	40	27	30	16	21	17	15	22
1939	58	28	30	30	27	17	24	18	16	50
1940	67	41	35	25	29	21	26	17	20	18
1941	82	52	45	36	32	31	34	23	22	18
1942	77	60	46	32	42	30	29	17	25	15
1943	93	51	56	36	38	29	39	27	37	14
1944	97	47	37	40	53	34	33	22	26	44
1945	96	48	61	36	45	29	37	24	26	24
1946	160	72	66	40	50	40	42	31	40	26
1947	150	73	47	48	53	30	56	38	45	22
1948	180	97	100	56	74	47	62	30	50	20
1949	180	67	100	47	75	37	64	33	39	30
1950	170	68	96	44	75	60	64	38	50	19
1951	170	53	105	56	82	41	70	41	68	18
1952	170	69	89	51	77	35	72	38	37	25
1953	130	56	86	42	78	38	64	37	51	14
1954	160	68	87	54	71	34	66	30	54	56
1955	160	64	65	55	77	44	60	38	43	38
1956	130	81	93	51	75	37	60	36	40	42
1957	140	51	83	43	74	38	67	36	50	35

v.p.—Vacant possession.   w.v.p.—Without vacant possession.

The Welsh data is as follows:

TABLE F III
Tenants' capital per acre
Welsh sample 1956/7[1]

	£'s per acre					
Type	0–49	0–99	50–99	100–199	200+	All
Dairy (better land)	54			42	37	32	38
(poor land)	36			28	34	35	37
Mixed (better land)		48		24	19		29
(poor land)		36		24	34	35	29
Livestock (better land)		24		18	29	{0·11	15
(poor land)						{0·17	
All farms	47		35	36	26		29

Notes: (i) refers to farms whose acreage is over 80 per cent rough grazing.

(ii) refers to farms with a rough grazing acreage under 80 per cent of the total acreage.

The total farm capital in Table F III is made up as follows:

(a) *Machinery.* The depreciated value of machinery on the farm.

(b) *Livestock.* The value of livestock is calculated on a herd basis as suggested by the Inland Revenue Authorities.

(c) *Other items.* For example, the value of crops in land.

No allowance is made for the balance of working capital not included in these calculations. The figures quoted are therefore likely to be an underestimate.

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The East Anglia figures are shown in Table F IV below.

TABLE F IV

Tenants' capital per acre
East Anglian sample 1956

Type			Size Groups (acres)				
		20–50	50–100	100–150	150–300	300+	All size groups
Upland (arable)	..	49	54	44	47	46	44
Fen (arable)	..	92	80	73	69	71	75

Analysis of sub-types of upland arable farms

Arable (mainly cereals)	..	35	41	39	40	39	40
Arable (mixed crops)	..	26	42	36	42	31	34
Arable and dairy	..	50	44	47	41	41	42
Arable and pigs	..	63	65	55	51	55	54
Arable and dairy, pigs and poultry	..	76	66	60	55	60	59
Arable and mixed and livestock	..	42	48	42	40	45	44

The estimation of capital on Table F IV is in three parts:

(a) Gross charges plus value of occupier's time plus value of home-grown foods brought forward from the previous year, less receipts for livestock and livestock products during the year. (This assumes that the farmer's outlay to cover the year's expenses of production will be relieved by income from stock, milk etc. which comes in at regular short intervals during the year.)

(b) Opening valuation of all livestock (subsequent purchases are allowed for under (a)).

(c) Closing valuation of all implements and machinery.

This method of calculation therefore allows for just if not all of the farmer's working capital.

Table F V below gives the national average opening and closing valuations for the years 1951/52 to 1955/56 from the Farm Management Survey. The figures are an under-estimate, since the method of calculation cannot take into account some of the farmer's working capital, particularly cash.

TABLE F V

Average of opening and closing valuations
(England and Wales)
(£'s per acre)

Type	Up to 50 acres	50–100 acres	100–150 acres	150–300 acres	300–500 acres	500+ acres
Dairy	..	44	34	35	35	31	
Livestock	..	36	29	25	23	18	9
Mixed	..	36	38	34	34	32	27
Arable	..	42	36	37	32	32	22
All types	..	37	31	29	27	25	18

Table F VI shows the breakdown of tenants' capital for the United Kingdom as a whole[4] in terms of livestock, crops, machinery and implements, stocks of purchased feed and other items for the years 1937/38 and 1952/53.

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TABLE F VI
Tenants' capital in the United Kingdom[a, b]—£

Item				Year		
				1937/38	1952/53	1957/58
Livestock	..	..	total	190	560	
			per acre	5·9	18	
Crops	..	..	total	150	610	
			per acre	4·6	20	
Machinery and implements		..	total	84·6	350	
			per acre	2·7	11	
Stocks of purchased feed	..		total	8·5	20	
			per acre	0·3	0·7	
Other items	..	..	total	21	77	
			per acre	0·7	2·5	
Total	..	..	total	450	1600	1900
Total	..	..	per acre	14	52	60

Notes: (a) Valuations for a given year are on the basis of the value of the currency in that year.
(b) Valuation of crops is estimated on the basis of rate of turnover.
(c) The figures cover circulating as well as fixed capital for all farming other than specialist horticulture under glass.

Table F VII below gives valuation changes between 1937/38 and 1952/53 reduced to 1937/38 prices.

TABLE F VII
Changes in the value of tenants' capital assets at constant prices
(1937/8=100)[3]

Tenants' capital assets	1937/8		1952/3		% change between 1937/8 and 1952/3
	Valued at 1937/8 prices				
	Value £m.	% of total capital	Value £m.	% of total capital	
Livestock	186·0	41·5	197·5	30·2	+6·2
Crops	147·6	32·9	200·7	30·7	+36·0
Machinery	84·6	18·9	226·7	34·7	+168·0
Purchased feed	8·5	1·9	5·2	0·8	−38·8
Other items	21·3	4·8	23·7	3·6	+11·3
Total	448·0	100·0	653·8	100·0	+45·9

The true increase of about 46 per cent represents about 3 per cent per year and this compares very closely with the rise in agricultural net output at constant prices over the same period.

The bank sample

The sample consists of some 414 farm accounts collected from various localities in England and Wales for the year 1957[1]. It is not possible to say how far the sample may be considered to be representative but on general grounds it seems probable that the smaller farms within it will probably contain a higher proportion of successful businesses than the national average. An attempt was made to classify the farms by type, but it was only possible to make a division which approximately parallels that of the Farm Management Survey. So far as possible specialist enterprises were excluded. The results are

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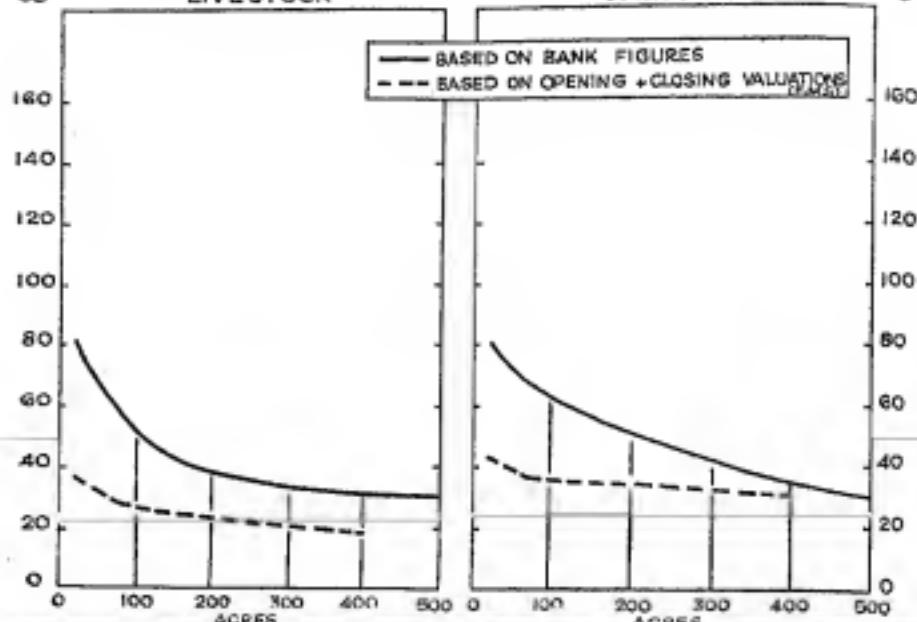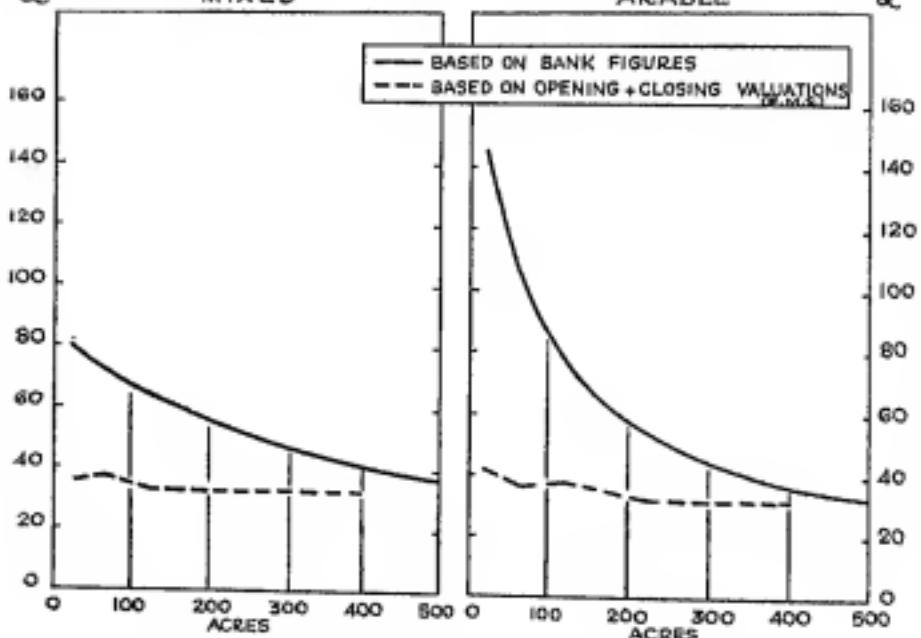
Tenants capital per acre

shown graphically in Fig. F 1 to F 4, in which capital per acre is plotted against acreage for each of the four main types of farm. The average of the opening and closing valuation figures for the years 1951/52 to 1955/56 derived from the Farm Management Survey data is included for comparative purposes. As would be expected the latter is consistently lower than the total tenants' capital per acre obtained from the bank sample: the latter includes the bank's estimates of the actual cash used as operating capital while the former excludes at least a proportion of the operating capital.

REFERENCES

1. WARD, J. T. Measuring Changes in Farm Sale Prices, *The Chartered Surveyor*, December 1957.
2. CHISHOLM, M. D. I. Agricultural Economics Research Institute, University of Oxford. *Personal Communication.*
3. Farm Management Survey (Wales). Department of Agricultural Economics, University College of Wales, Aberystwyth.
4. Farm Management Survey (Eastern Province). School of Agriculture, University of Cambridge. (Analysed from original research.)
5. CHEVELEY, S. and PRICE, O. Capital in United Kingdom Agriculture—Present and Future. I.C.I. Ltd., December 1955.
6. PRICE, O. I.C.I. Ltd., *Personal Communication.*

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DATA ON MECHANIZATION

Survey of tractor/acreage relationship by the National Institute of Agricultural Engineering

Tables G I and G II show the average number of acres per tractor in selected areas of England and Wales as calculated in this study by N.I.A.E.[1]. Table G I shows the tillage acreage per tractor, the farms being grouped according to the number of tractors on the farm. Table G II shows the total acreage grouped in the same way. The information was obtained from the 4th June returns and machinery census for 1952.

In both Tables G I and G II, the county grouping has been so arranged that farms of approximately similar type are grouped together. The figures in brackets represent the number of farms in the sub-sample.

TABLE G I
Tillage acreage per tractor (N.I.A.E. Study 1952)

County	Number of tractors on farm						
	1	2	3	4	5	6	7+
Anglesey	30 (138)	34 (10)	51 (2)				
Cheshire	27 (46)	28 (23)	39 (3)	21 (1)			
Cornwall	30 (228)	56 (72)	43 (12)	58 (3)	75 (1)	52 (1)	
Hampshire	42 (24)	65 (21)	65 (16)	99 (3)	110 (4)	91 (3)	110 (5)
Huntingdonshire	33 (132)	35 (95)	43 (33)	50 (17)	68 (14)	80 (3)	64 (10)
Northamptonshire	53 (90)	56 (27)	37 (7)	74 (4)	47 (1)	62 (2)	55 (1)
Northumberland	49 (24)	51 (12)	60 (7)				
Radnor	39 (112)	50 (15)					
Somerset	16 (103)	20 (46)	31 (13)	52 (2)	27 (3)		
Suffolk	36 (35)	44 (19)	57 (10)	66 (2)	62 (5)		51 (1)
Yorkshire	39 (69)	52 (60)	52 (31)	63 (3)	68 (2)	62 (7)	75 (2)
All	37 (941)	44 (410)	48 (154)	62 (44)	68 (30)	71 (16)	76 (19)

TABLE G II
Total acreage per tractor (N.I.A.E. Study 1952)

County	Number of tractors on farm						
	1	2	3	4	5	6	7+
Anglesey	61 (138)	77 (10)	74 (2)				
Cheshire	90 (46)	75 (23)	84 (3)	40 (1)			
Cornwall	68 (228)	71 (72)	62 (12)	85 (3)	73 (1)	58 (1)	
Hampshire	68 (24)	85 (21)	85 (16)	110 (3)	138 (4)	100 (3)	120 (5)
Huntingdonshire	38 (132)	40 (95)	52 (33)	56 (17)	77 (14)	100 (3)	73 (10)
Northamptonshire	100 (90)	97 (27)	71 (7)	94 (4)	72 (1)	70 (2)	97 (1)
Northumberland	150 (24)	134 (12)	130 (7)				
Radnor	88 (112)	89 (15)					
Somerset	70 (103)	60 (46)	72 (13)	87 (2)	55 (3)		
Suffolk	46 (35)	58 (19)	77 (10)	56 (2)	76 (5)		75 (1)
Yorkshire	57 (69)	72 (60)	67 (31)	72 (3)	89 (2)	76 (7)	81 (2)
All	68 (941)	69 (410)	70 (134)	75 (44)	83 (30)	85 (16)	89 (19)

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Table G III below gives the number of tractors per 100 acres on farms in the East Anglia Farm Management Survey sample for 1955/56[3].

TABLE G III

Tractors per 100 acres—East Anglia 1955/56

Size Group	Tractors per 100 acres	
	All soils	Upland farms only
20– 50	4·2	3·6
50–100	2·7	2·5
100–150	2·0	1·8
150–300	1·7	1·7
300+	1·2	1·2

Notes: (a) All tractors were counted equally (no allowance for differences in size or age was made).

(b) The figures in the above tables do not necessarily reflect the *usage* of tractors. Some farms have standby tractors (usually older machines) which count against the number held but do not contribute equally to the work done with those in regular use.

Tractor requirements

Table G IV below shows the number of tractor hours required for different farming operations[3]. The original basis for this work was a detailed study of 17 farms in the south of England for 1952/53[4], since modified and extended.

TABLE G IV

Tractor hours required

Operation	Tractor hours per acre	Operation	Tractor hours per head
Cereals and pulses	12	Dairy cows	8
Sugar beet and potatoes ..	35	Other cattle (over 2 years)	7
Fodder roots (carted) ..	40	Cattle (1–2 years) ..	5
Fodder (fed in field) ..	15	Calves	3
Bare fallow	10	Sows	2·5
Leys (grazed)	2·5	Fattening pigs ..	0·5
(hay)	7	Poultry (per 100) ..	4
(silage)	14	Ewes	1·5
Permanent pasture	1	Other sheep ..	1
Meadow hay	5		

Table G V below shows the tractor requirements related to number of tractor hours. This results from combining the results quoted above with a further detailed survey of tractor usage on 56 East Anglian farms[5].

TABLE G V

Tractor hours and number of tractors required

Up to 800 tractor hours	..	..	1 tractor
801 to 2000 tractor hours	..	..	2 tractors
2001 to 3200 tractor hours	..	..	3 tractors
3201 to 4400 tractor hours	..	..	4 tractors
4401 to 5600 tractor hours	..	..	5 tractors
5601 to 6800 tractor hours	..	..	6 tractors

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Table G VI below gives the results of a survey of tractor use on large arable farms in East Anglia compared with the theoretical requirements calculated on the basis of Table G IV and G V above[1].

TABLE G VI

Comparison of actual tractors used and theoretical requirement on certain larger East Anglian arable farms

Farm	Acreage	No. of tractors	Theoretical requirement	% difference
A	541	6	9	33
B	543	4	10	60
C	583	5	10	50
D	455	4	6	33
E	675	6	10	40
F	793	7	11	36
G	398	3	5	40
H	365	4	5	20
I	877	5	12	58
J	1249	9	14	36

Note: These farms are a series of close-knit arable units under company ownership.

Total capital cost of mechanization

The results of the theoretical and actual tractor requirements (Tables G IV and G V above) were combined with an analysis of implement requirements or usage in East Anglia and the resultant total cost of machinery per unit against acreage (Fig. G-1)[9]. Three different scales of implements were selected representing simple, intermediate and advanced mechanization. The curves represent total costs on a new equipment basis and the scales are appropriate to an average mixed arable farm.

The labour and machinery complex

It has been argued that labour and machinery are complementary inputs owing to the possibility of substitution between them. An analysis of labour and machinery costs has been made on this basis[9], relating to 40 predominantly milk-selling farms in South-East England (Table G V). The costs are grouped by standard output (a measure which corresponds to gross output per unit yields).

The above analysis shows that:

   (a) The total labour and machinery costs per unit of output decrease with increasing output, indicating that there is a definite scale effect with increasing size of business. This scale effect appears largely due to the machinery component: as would be expected the cost of paid labour rises steeply with farm size as unpaid labour falls, but the total labour remains almost constant.

   (b) The composition of the power and machinery costs shows that depreciation and contractor's charges are a bigger proportion of the total on the smaller farms, but repairs are very much less. For this sample, as with the East Anglian sample, the structure of mechanization costs is different on small from large farms.

   (c) Power and machinery costs per 1000 tractor work units are greater on the smallest farms than on the three largest groups.

Higher machinery costs per unit of output on small farms is associated with heavy charges for contract work and heavy depreciation. The estimated requirements in terms of tractor work units per acre are however, much the same on small farms as on large, but the amount of tractor work units required to produce a unit of output increases with increasing size. In physical terms, machinery, therefore, makes a greater contribution to output on the larger farms, but costs more per unit of output on small farms, for the reasons noted in the preceding paragraph.

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Labour and machinery complex analysis of predominantly milk-selling farms in South-East England

	Range of standard output per farm			
	Under £3000	£3000–£4999	£5000–£7999	£8000 and above
Number of farms	11	11	9	9
Average standard output per farm ..	£2200	£4600	£6600	£9300
Average acreage	45	110	160	200
Labour and machinery costs per £100 standard output	£	£	£	£
Paid labour	14	22	28	28
Unpaid labour	18	8·7	4·6	4·5
Power and machinery	20	15	16	15
Total labour and machinery ..	52	46	49	48
Composition of power and machinery costs	%	%	%	%
Licences, insurance and repairs ..	18	27	31	34
Fuel and electricity	25	34	28	26
Contractor's charges	20	13	7	9·6
Depreciation	38	25	34	31
Power and machinery costs per 1,000 tractor work units	£ 870	£ 590	£ 600	£ 520
Labour cost per 100 man work units ..	170	160	170	170
Labour and machinery costs per 100 acres				
Paid labour	660	930	1200	1300
Unpaid labour	820	360	190	200
Total power and machinery ..	920	630	680	700
	2400	1900	2000	2200
Estimated requirements				
Tractor units per acre	10	10	11	13
Tractor units per acre £1000 standard output	220	250	260	270

REFERENCES

1. SLATER, J. K. W. Survey of Tractor Usage. National Institute of Agricultural Engineering.
2. Farm Management Survey (Eastern Province) School of Agriculture, University of Cambridge.
3. STURROCK, F. G. Farm Mechanisation, September, October, November and December 1955.
4. GORDON, I. R. Investigation into the use of tractors on 17 farms in the South of England 1952-3. University of Reading, Agricultural Machinery Department).
5. WALLACE, D. B. School of Agriculture, University of Cambridge. Personal Communication.
6. SYKES, J. D. Wye College. Personal Communication.

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APPENDIX H

LAND USED FOR AGRICULTURE IN ENGLAND AND WALES

(Extract from World Census 1950)

Land used for agriculture (by numbers of holdings) which is owned and rented in England and Wales

(Thousands)

Kind of tenure	Size of holding (acres of crops and grass and rough grazing)					
	Under 5 acres	5–50	51–100	101–150	151–200	201–250
Owned	43	70	20	11	6	3·8
Rented	35	85	39	22	13	8·2

Kind of tenure	Size of holding (acres of crops and grass and rough grazing)					
	251–300	301–400	401–500	501–700	701–1000	1000 and over
Owned	2·2	2·3	1·2	1·0	0·5	0·4
Rented	5·0	5·4	2·3	1·8	1·0	0·7

Acreage of land used for agriculture owned and rented in England and Wales

(Thousands)

Kind of tenure	Size of holding (acres of crops and grass and rough grazing)					
	under 5 acres	5–50	51–100	101–150	151–200	201–250
Owned	120	1300	1600	1500	1200	970
Rented	95	1700	2600	2500	2100	1700

Kind of tenure	Size of holding (acres of crops and grass and rough grazing)					
	251–300	301–400	401–500	501–700	701–1000	1000 and over
Owned	710	930	590	650	470	760
Rented	1300	1700	950	970	760	1100

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APPENDIX I

EXCHEQUER ASSISTANCE TO FARMING RELATED TO MARKET PRICES

The table below is extracted from a written answer given on the 3rd April 1958 by Mr. John Hare (*Hansard* No. 419 paragraph 198). It shows the amount of Exchequer assistance expressed as a percentage of the estimated average market values for each of the commodities guaranteed under the Agricultural Act, 1957, for the periods shown.

Commodity	Period	Percentage of estimated average market value
		per cent
Fat cattle	1957–58 financial year	24
Fat sheep	1957–58 financial year	21
Fat pigs	1957–58 financial year	29
Shell eggs (Note 1)	1957–58 financial year	47
Milk (Note 2)	1957–58 financial year	5
Wheat	Cereal year to end June, 1958	42
Rye	Cereal year to end June, 1958	10
Barley	Cereal year to end June, 1958	40
Oats	Cereal year to end June, 1958	27
Wool	Cereal year to end June, 1958	21
Potatoes	1957 clip	(see Note 3)

Notes: (1) The estimated market value is assumed to be the average price at which eggs are delivered to wholesalers.

(2) The estimated market value is assumed to be the average return to milk producers less the subsidy.

(3) It is not practicable to estimate with any accuracy the average market value of potatoes eligible for guarantee. Exchequer assistance in respect of the 1957 crops would, however, only represent a very small percentage of this.

SOCIOLOGICAL INFORMATION

ORIGIN OF FARMERS

The national information on the sociology of farming is limited and not very recent. Individual research workers have, however, made limited surveys in the course of particular investigations, and from these it is possible to build up a picture of the farming community.

Table J I is based on one such survey[1] of 147 farmers in Oxfordshire and Warwickshire in 1950.

TABLE J I
Occupational background of sample of 147 farmers (1950)

Previous occupation	Number	Percentage
Father's farm	66	45·4
Father's farm and hired worker elsewhere ..	14	9·5
Father's farm and non-agricultural workers ..	11	7·5
Farm worker, but not of farmer	7	4·3
Total—farm workers (excluding non-farm workers) ..	98	66·7
Farm worker (less those whose fathers were farmers) ..	11	7·5
Farm worker and non-agricultural work	6	4·1
Total—previously farm workers	17	11·6
Non-farm work	32	21·7
Total	147	100·0

Note: Five farmers whose previous occupations had nothing to do with farming were in fact farmers' sons.

Farmer's background by size of farm

A breakdown of occupational background by size of farm was not available for the Oxfordshire and Warwickshire sample, but questions on this subject were included in a survey of 81 farms made in the course of an investigation into haymaking methods in the North and South of England and Wales at N.I.A.E.[1]. Question A was "Was your father a farmer?" and question B "Did you succeed your father?" There were regional differences in the answers, associated with differences in the size pattern of farms, in the two areas, but Table J II below summarizes the answers for the whole sample.

For the Oxfordshire and Warwickshire survey, about two-thirds of farmers were farmers' sons directly or indirectly recruited from their fathers' farms: about 70 per cent of those who had other experience of one kind or another are included. For the N.I.A.E. sample about 80 per cent of farmers were farmers' sons. This figure obtained from both surveys agree fairly well with each other, and with the Social Survey study of 1944, based on a sample of about 2000 farmers, which indicated that about 80 per cent of farmers were farmers' sons[1]. The small N.I.A.E. sample divided into size groups does not show that there is any particular difference in farmers' origin with the range of size groups concerned but as the maximum size in this sample was 150 acres, this information is of limited value.

A rather smaller proportion (about 60 per cent) of farmers actually succeeded their

Occupational background of farmers by size of farm
(N.I.A.E. Survey 1956)

Size Groups		No. of farms	Question A		No. of farms	Question B	
			Yes % of size	No % group		Yes % of size	No % group
20– 50 acres	..	18	89	11	16	56	44
50–100 acres	..	29	69	31	19	63	37
100–150 acres	..	31	90	10	29	59	41
Total	..	78	82	18	64	59	41

Note: The total of the sample was 81 farms, but as will be seen from the above not all farmers answered the questions.

fathers on the same farm: once again no particular inferences can be made from the slight differences observed between the size groups of the N.I.A.E. sample. In general, the conclusion may be drawn that about three-quarters of farmers in England and Wales are farmers' sons, and a large proportion of them succeeded their father on the same farm. A further study of inter-relationships between farmers of the Oxfordshire and Warwickshire sample indicates that there are extensive family relationships apart from the simple father and son relationship, supporting the idea that the farming community is a close-knit family structure extending over several generations.

TRAINING OF FARMERS

The Wartime Social Survey[1] provides an indication of the way in which farmers received their training. Table J III below summarizes the information:

TABLE J III
Sources of training of 1968 farmers
(England and Wales 1944)

Types of Training			Percentage
On father's farm	..	..	77
On relative's farm	..	..	6
As a pupil on another farm	..	..	7
At an agricultural college or institute	..	3
As a farm worker	..	..	7
Other sources	..	..	12

Note: 12 per cent of the sample received training from more than one source.

There is little more recent information, but as the proportion of farmers who are sons of farmers appears to have remained roughly constant since 1944, and this proportion in 1944 was very much the same as the proportion of those receiving their training from their father, it seems a reasonable inference that approximately the same pattern of occupation, succession and training exists today. Thus it is probably true that the majority of farmers today have received little or no academic training for their business, but have picked it up from their father or other relatives. In the Oxfordshire and Warwickshire survey only about 3 out of 147 farmers had received training at an agricultural college or institute. As for their general education, the Wartime Social Survey indicated that only some 20 to 30 per cent of farmers had attended secondary or similar schools. No precise data on the breakdown of training by size of farm exists. In all probability, however, the sons of small farmers who are themselves to become farmers are less likely to receive formal training than the sons of larger farmers because of the dependence of the small farmer on unpaid family labour.

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Higher and technical education

has about doubled since before the war. It is now about 1700 (1957/58), although the numbers have decline by about 800 since 1950. In addition to university education, there are now 37 farm institutes with now 2200 students, as against 16 institutes with 774 students in 1939, and at a level intermediate between university departments and the farm institutes there are the agricultural colleges with 1100 students. The three levels of agricultural education have the following annual output[4].

University Departments 500 graduates per year in Agriculture and Forestry, of which 100 only go into farming.

Agricultural Colleges 530 diploma holders per year, of whom 60 per cent enter the industry as either skilled workers, foremen, or as farmers.

Farm Institutes 200 certificated students of whom the great majority enter the industry either on their father's farms or as skilled workers.

Assuming that there are about 300 000 full-time farmers in the United Kingdom, the annual intake into farming of trained people at the managerial level is between 0·5 per cent and 1 per cent of the total number of farmers. This number is increased slightly by the unknown number of farm institute students who succeed their fathers.

MOBILITY OF FARMERS—THE FARMING LADDER

It is important to determine whether there is opportunity for mobility within the farming career; whether, for example, general conditions favour the entry and "promotion" of keen and knowledgeable young men who are capable of rapid advancement. The term "farming ladder" is taken to include both opportunity for entry and opportunity of advancement in farming. There are thus several related ladders.

Farm workers to farmers

About 10 per cent of farmers had started as farm workers in the Oxfordshire and Warwickshire sample (Table *I*). A study of the average ages of the farmers concerned and their ages in starting to farm on their own account showed that the majority started after the age of 40. For Wales most small holders took their holdings between 30 and 40. It is clear that apart from the difficulty in obtaining a local authority smallholding (or obtaining a privately-owned one) farm labourers must wait for many years to accumulate sufficient capital.

Each increase in the number of tenancies granted by smallholding authorities in England and Wales has been estimated for the period 1949-54 and 3·2 per cent of the whole. In Wales in 1956 there was a waiting list of suitably-qualified applicants (i.e. farm workers who wished to become smallholders) which was 90 per cent of the total County Council holdings in the principality; a well-qualified applicant had to wait on average about seven years before obtaining a holding, though much depended on the county in which the applicant resided[4]. These statistics, of course, refer only to statutory smallholdings; doubtless a further small percentage of farm workers manage to obtain small farms privately.

It is more difficult to determine the amount of movement by occupiers of smallholdings to larger farms. It must be less than 3·2 per cent, on average, of the County Council Smallholdings, since it is known that a large proportion of these tenants remain on their holdings until they retire or die. Moreover, about one-third of the total turnover was due to notices to quit, and a proportion of the remainder was due to the tenants leaving farming altogether. In the study of smallholding policy in Wales, it was stated that less than 1 per cent of all statutory smallholders in Wales moved to a larger farm. The N.I.A.E. survey showed that 1 per cent of small farmers had managed to purchase or rent more land; about 2 per cent of farmers in the sample had in fact been farm labourers and had taken their farms after some years on a smallholding. The Land Settlement Association, which was more concerned with small intensive holdings of about ten acres provided with central co-operative services for marketing

etc., presents a slightly different picture, perhaps due to the physical differences of the scheme compared with the Statutory Smallholdings. About 3 per cent per annum, averaged over the period 1945 to 1956 of L.S.A. tenants moved to other farms, though there is nothing to indicate whether they took over larger farms. Except for some L.S.A. holdings and doubtless some privately owned smallholdings, the movement from smallholdings to small farms probably represents a real movement of two rungs up the farming ladder, since most tenants of local authority holdings came from the ranks of the farm workers.

Movement between farms

Table J IV below, compiled from the National Farm Survey of 1944, shows the average number of years of occupation of farms up to 1941 by size of farm:

TABLE J IV

Period of occupation of farms up to 1941 in England and Wales

Size Group (acres)					Mean number of years
5– 25	..	..	..	..	13·3
25–100	..	..	..	..	13·5
100–300	..	..	..	..	14·1
300–700	..	..	..	..	15·1
700+	..	..	..	..	17·2
Average	..	..	..	..	13·7

Note: These periods of occupation are of course "unfinished" in the sense that they represent the duration of occupancy of those farmers *in situ* up to the time of the survey. It has been estimated that the mean *total* period of occupancy of farms generally was about 23 years.

Throughout the range of size groups the period of occupation was higher for Wales than for England, perhaps due to a greater continuity of possession within families in Wales. In both countries, however, the trend was towards a shorter period of occupancy for small farms than for larger farms. This could be accounted for either by a greater rate of movement within the poorer (usually smaller) group of holdings or by a tendency for small farmers to move to larger farms. Further information on the subject is given in Table J V below which shows both average ages of farmers and average size of their farms, the sample being grouped by number of moves.

TABLE J V

Moves of farmers with average ages and size of farms
(Oxfordshire/Warwickshire Sample 1950)

Changes in size from previous farms	No. of farms in groups	Percentage of sample	Average age of farmer	Average size of farm
More than one move increased and then decreased	13	9	63·2	119
Decreased only ..	17	12	57·1	148
Increased only ..	33	22	54·0	228
No change of farm ..	84	57	48·2	140
All farmers	147	100	52·8	159

The youngest farmers on farms of acreage little less than the average of the sample: they either were not yet in a position to move from their first farm, or did not intend to. This category also included those who started farming on a relatively large farm almost always because they inherited the farm from their father or other relative. The oldest farmers were those on the smallest farms: they had in general made two moves, the second a decrease in size. Obviously this group was composed of farmers

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who, while not retiring, wanted to lessen their responsibilities as they became older. Their farms were smaller than the average acreage for the sample. The next oldest were those who had made only one move, a decrease in size. It is possible that this category covered a high proportion of the unsuccessful farmers of the sample. Finally, the farmers who had made one move and increased the size of their holdings were the second youngest group (about the average age for the sample) and they occupied farms which were above the average size for the sample.

Farmers in the sample were asked whether they wanted to move from their present holdings. About three-quarters were content as they were, and a fifth either wanted to expand their present holdings or move to a larger farm. A small fraction wished to move to smaller farms or to get out of farming altogether.

The survey shows the existence of a pattern in farming careers in the middle size range of farm. There is some evidence that some small farmers who are young and keen are able to move to larger farms, while towards the end of their careers a moderate proportion manage a second move back to a small farm. In general, however, the majority of farmers remain on the same farm once they have attained the status of farmer. The sample consisted mostly of small and middle sized farms, the majority between 100 and 200 acres. Therefore, while the information tends to support the view that a farming ladder exists in a limited way in farming, and to a lesser extent from small to medium sized farms, there is no evidence that movement from this group to very large farms takes place.

Summary of information relating to the farming ladder

Within the limited scope of the available information, we can say that:

(a) The opportunity for farm workers to move up one rung of the ladder to become smallholders is small; perhaps one-tenth or one-eighth of farmers start in this manner.

(b) For the vast majority of farm workers who manage the first rung, the smallholding remains in fact their ceiling. Less than one per cent of County Council smallholding tenants move to larger farms each year.

(c) For the younger farmer who obtains his first farm early, there are greater chances of obtaining a bigger farm: perhaps 20-30 per cent of such farmers may be in a position to move to a better farm. These farmers constitute, however, a very small proportion of the farming community; most are enabled to start their career two or three rungs up the ladder by inheriting a good farm or the money to purchase one.

(d) A moderate proportion of farmers will move back to a small farm in their later years.

(e) There is evidence to show that the farming ladder does not extend much above the medium-sized farms.

REFERENCES

1. ASHTON, J. The Recruitment of Farmers in England and Wales. B.Litt. Thesis, University of Oxford, 1955.
2. SLATER, J. K. Unpublished Pilot Survey of Farmers' Background N.I.A.E. 1957.
3. Agricultural Information and the Farmer. Wartime Social Survey. (H.M.S.O. 1944.)
4. Committee on Further Education for Agriculture provided by local Education Authorities, Report issued December 1958. H.M.S.O.
5. ATTWOOD, E. A. Statutory Smallholdings in Agriculture. University College of Wales 1956.